HYDRAULIC ANALYSIS
OF
AGUA FRIA CHANNEL
MCDOWELL ROAD TO THOMAS ROAD
MARICOPA COUNTY, ARIZONA

Lowry & Associates

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Prepared for
Dibble and Associates
Phoenix, Arizona

Registered Professional Engineer (Civil)
CERTIFICATE NO.
7184
GEZA E.
KMETTY
Date Signed 10-2-92
ARIZONA, U.S.A.

by
Dr. G.L. Guymon
G.E. Kmetty, P.E.

Lowry & Associates
549 East Willetta Street
Phoenix, Arizona 85004
(602) 271-9555

TABLE OF CONTENTS

		Page
I.	Introduction	1
	1.1 General	1
	1.2 Available Information	1
II.	Site Description	2
	2.1 Geomorphology	2
	2.2 Hydrology	4
III.	Flow Resistance Coefficient	4
IV.	Scour Analysis	5
	4.1 General and Local Scour	5
	4.2 Channel Stability	8
	4.3 Channel Maintenance	10
V.	Mathematical Model	14
	5.1 Methodology	14
	5.2 Assumptions	15
VI.	Suggested Alternative Designs	17
VII.	Attachments	
	7.1 Plan and Profile	
	7.2 Hec-2 Results for Existing Conditions.	
	7.3 Hec-2 Results for Revised Conditions	

I. Introduction

1.1 General

Presented in this report is our analysis of hydraulic conditions of the proposed Agua Fria Channel including the proposed McDowell Road Bridge, from McDowell Road to Thomas Road, for 91,000 cfs.

Mathematical hydraulic modeling techniques were employed utilizing the HEC-2 computer program for the analysis of the existing conditions, and the channel, with the proposed bridge improvements at McDowell Road.

1.2 Available Information

The analysis presented in this report is based on the following information:

1. Aerial photographs by Kenney Aerial Mapping dated 1/21/81 and 2/20/80.
2. 1" = 100', 2' C.I. contour maps by Kenney Aerial Mapping, based on 1/21/81 conditions.
3. 1" = 200', 2' C.I. contour maps, by M.C.F.C.D. and U.S. Army Corps of Engineers, dated April 20, 1982.
4. Digitized crossections based on 4/20/82 M.C.F.C.D. Maps as digitized by Dibble and Associates.
5. Proposed channel profile and crossection by Dibble and Associates.
6. Proposed bridge improvements by Hoffman-Miller Engineers.
7. Preliminary and Final Geotechnical Investigation Reports by Sergent Hauskins and Beckwith, 1982.

8. Preliminary Report - McDowell Road Bridge at the Agua Fria River - 100,000 cfs Bridge Feasibility, April, 1981 by SCI Consulting Engineers, Inc.

9. Design discharge of 91,000 cfs by M.C.F.C.D.

10. "HEC-2 Water Surface Profiles", U.S. Army Corps of Engineers, 1976.

11. FHA, U.S. Department of Transportation (1975), Highways in the River Environment, Hydraulic and Environmental Design Considerations.

12. Leopold, Bagnold, Wolman and Brush (1960) Flow Resistance in Sinuous or Irregular Channels, Geological Survey Prof. Paper 282-D.

13. Culbertson, Young and Brice (1967) Scour Fill in Alluvial Channels with Particular Reference to Bridge Sites, U.S. Geological Survey, Open File Report.

14. Henderson, (1966) Open Channel Flow, Macmillan.

II. Site Description

2.1 Geomorphology

Agua Fria River is a braided river with significant meanders of its thalweg in places. Generally, braided rivers are considered as aggrading in their natural undistrubed state. Where mans activities may modify such streams their fluvial characterisitics may be modified. This was apparently the case at the Indian School Road Bridge crossing. The construction of the bridge and an associated downstream gravel mining operation has modified a short reach of the stream into a degrading mode. The Simons and Li Report estimated a total general regional scour and local scour of 30+ feet at the

Indian School Road Bridge which may have occurred in the 1980 flood. The bridge failed due to scour at two of its piers. These piers were supported by spread footings placed 25 feet below the streambed.

Boring information developed by Sergent Hauskins & Beckwith Consulting Geotechnical Engineers indicates that materials in the area of the proposed bridge and proposed realigned channel are generally fine sands and sandy silts with some traces of gravel. The D_{50} size is on the order of 0.3 to 0.4 mm with the largest size being generally less than 1/4 inch. Materials of this nature generally exist at the proposed bridge alignment to a depth of about 25 feet where gravel and other hard material prevent augering.

Visual inspection of the site and study of aerial photographs taken during the February 1980 flood indicate that the Agua Fria River, in the vicinity of McDowell Road is a wide meander which probably extends as far east as it can or has extended historically. Just downstream from McDowell Road there is a sharp "dog leg" to the west suggesting that the river may be difficult to control and realign in this area.

Currently, there is a gravel mining operation several hundred feet north of McDowell Road and in the main meander of the Agua Fria River channel. The proposed realignment of the river is to the west of the gravel operation.

According to the Simons and Li Report, which reviewed the general geomorphology of the Agua Fria River and its tributaries upstream, no new major changes are expected in the future due to modification by man. Consequently, major regime changes are not anticipated or evaluated as part of this project.

2.2 Hydrology

The largest recorded flow in the river, since the construction of the Lake Pleasant dam in 1927, was the 66,000 cfs released on February 20, 1980. The maximum discharge of record prior to the dam construction is 105,000 cfs that occurred in January, 1916, and November 1919, and is the greatest since 1889.

The U.S. Army Corps of Engineers published on March 4, 1981 the following discharges for the Agua Fria River at the McDowell Road:

10 year	-	16,000 cfs
25 year	-	49,000 cfs
50 year	-	69,000 cfs
100 year	-	91,000 cfs
S.P.F.	-	137,000 cfs
500 year	-	182,000 cfs

The 100 year discharge of 91,000 cfs was selected by the FLOOD CONTROL DISTRICT of MARICOPA COUNTY as the design discharge for this project.

III. Flow Resistance Coefficient

For the purpose of the HEC-2 backwater analysis, the following Mannings "n" values were used:

a. I-10 to McDowell Road (Downstream of the proposed bridge). The channel is expected to remain in its existing condition with westerly overbank n = 0.045, channel n = 0.035, easterly overbank n = 0.040.

b. Underneath the proposed McDowell Road Bridge and upstream inside the proposed new 1100' bottom earthlined channel, n = 0.018.

IV. Scour Analysis

4.1 General and Local Scour

There are two types of scour that may occur: general regional scour and local scour. General regional scour is most often associated with bridge crossing constriction. Local scour is induced by the bridge piers.

Assuming the proposed rechannelization occurs before the bridge is built or occurs simultaneously, general regional scour will be zero since no constriction of flow will occur. The average cross-sectional sediment entrainment power will remain constant along the channel in the vicinity of the bridge. Additionally, the proposed channel slope, from 1000 feet upstream of the bridge to I-10 (1300 feet downstream), when realigned, is about the same as the existing regional slope of the Agua Fria River channel (i.e. 0.0011). As indicated previously, the existing Agua Fria River channel is assumed to be aggrading. The new section in the vicinity of the proposed McDowell Road Bridge crossing will probably be in equilibrium over a long-term period.

However, the river channel is generally unstable due to its ability to entrain the fine soil particles in the area. Without significant bank protection of the proposed channel realignment, short-term meanders may develop during severe or even moderate flooding. The thalweg will probably change locations frequently. Assuming the bridge abutments are properly protected by rip rap, the proposed bridge will act as a permanent structure, pinning the river at the same location. Any meanders that develop will probably do so upstream with the result that flow might pass the bridge at an angle. If the thalweg is say on one side of the bridge, flow will be concentrated at this side while the other side is actually experiencing sedimentation, like on the inside of a river bend. To account for such a possibility, a reduction in flow area will be assumed. Making such an assumption the following formula may be used (Culbertson, Young, and Brice, 1967):

$$\frac{y_2}{y_1} = \left(\frac{b_1}{b_2}\right)^{0.64}$$

where y_2 is the depth of flow at bridge, y_1 is the upstream depth, b_2 is the water surface width at the bridge, and b_1 is the upstream water surface width. This equation is derived from Manning's equation, continuity, and DuBoy's bedload formula. It is generally applicable where the width of construction is 25 percent, or less, as verified by a large amount of data assembled by Griffith. Thus, assume a

25 percent constriction (which is considered reasonably conservative).

$$y_2 = (9.23)(1.25)^{0.64} = 10.65 \text{ ft.}$$

Where the upstream depth is estimated using the design 100-year discharge and the HEC-2 computer model. The computed depth at the bridge using the HEC-2 model is 9.40 feet, thus estimated equilibrium general scour is:

$$y_s = 10.65 - 9.40 = 1.25 \text{ ft.}$$

Local scour at the bridge piers is caused by a "horseshoe" shaped vortex which forms on the downstream side of a pier. This type of scour is a major factor in most bridge failures (e.g. the Indian School Road Bridge). Procedures recommended by FHA (1975) are well documented and are appropriate to this analysis. Local scour at cylindrical piers can be estimated from the emperical formula:

$$Y_s = 2.0\ y_1 \left(\frac{a}{y_1}\right)^{0.65} F_1^{0.43}$$

Where y_s is the scour at one bridge pier, y_1 is the upstream depth, a is the pier diameter, and F_1 is the upstream Froude Number. This equation was developed from a large number of laboratory studies of cylindrical piers placed in material sizes very similar to those found at the proposed bridge site. Thus for one pier:

$$y_s = (2.0)(9.23)\left(\frac{5}{9.23}\right)^{0.65} (0.54)^{0.43} = 9.51 \text{ ft.}$$

For two piers oriented parallel to the flow, a correction reduction is recommented (FHA Manual); thus:

$$y_s = (9.51)(0.9) = 8.56 \text{ ft.}$$

which represents the average equilibrium local scour at a pier group during the design discharge. The instantaneous scour may be 1.3 times the equilibrium scour (FHA Manual); hence:

$$Y_s = (1.3)(8.56) = 11.13 \text{ ft.}$$

As mentioned previously, there is the possibility of thalweg meander such that flow may be at an angle to the pier group alignment. Assuming a 15° skew angle to the flow, the FHA manual suggests a correction factor of 1.5: thus:

$$Y_s = (1.5)(11.13) = 16.69 \text{ ft.}$$

The total scour estimated for the bridge crossing is the sum of local and general regional scour; i.e.

$$Y_s = 16.69 + 1.25 = 17.94 \text{ ft.}$$

It is believed that this estimate is conservative with a safety factor of about 1.5. The proposed pier depth of 20 ft. is adequate with a safety factor of 1.7. The I-10 bridge piers were constructed to a depth of 26 feet (from streambed to spread footing) where apparently denser material is encountered.

4.2 Channel Stability

As was previously stated, the Agua Fria River in the general area of the project site is unstable. Usually extensive flood control work is required to permanently train such rivers.

Simulation using the HEC-2 computer program with a design discharge of 91,000 cfs indicated that the unmodified flood plain north of I-10 is quite extensive, being over a mile wide just north of the existing McDowell Road. Average simulated velocities are about 4.8 fps and the resulting Froude No. is about 0.28, which according to Leopold et al (1960), indicates a meandering tendency. Under existing undisturbed conditions, the fine grained bed materials can be entrained and eroded. Local armoring, which was visually observed, will only increase the tendency for meander development and the promotion of large scale eddies.

Simulations using the HEC-2 computer program for the proposed rechannelization of the Agua Fria River indicate that average velocities may be on the order of 9.2 fps with a corresponding Froude No. of 0.53. Large velocities arise from the fact that the flow length has been decreased by straightening the channel from Thomas Road extension to I-10. Average invert slopes have been increased from 0.0011 (undisturbed existing thalweg) to 0.00155 (minimum 0.0012 and maximum 0.0027). Increased velocities will undoubtedly entrain and erode the proposed earthlined channel. Some bottom erosion will occur; however, the most likely erosion will be the bank materials. In other words, the river will attempt to restore its "equilibrium slope" by cutting into banks and establish large meanders. If one assumes that

essentially a sine wave shaped meander pattern will develop between McDowell and Thomas Roads, a sine function amplitude of about 1400 feet will be required to restore a slope of 0.0011. This means that the Agua Fria River will potentially erode a minimum 850 feet on each side of the proposed channel banks. On the east, this would place the river bank in its existing channel. Such a possibility is fairly likely even at much lesser flows than the design flow of 91,000 cfs.

It is concluded from this analysis that the proposed earth-lined rechannelization of the Agua Fria River is not a practical and functional design. Moreover, if a large meander were to develop immediately upstream of the proposed McDowell Road Bridge, a severe skew of the flow may result, endangering the bridge abutments and possibly the piers. Furthermore, head cutting would probably be initiated, extending upstream and possibly jeopardizing upstream structures.

4.3 Channel Maintenance

The question regarding the degree of maintenance required to maintain the proposed realigned Agua Fria River channel is very difficult to answer since very little research has been conducted upon frequency distribution of factors that affect the geomorphic process. From previous studies, we have some analysis of flood frequency for the site. Table I presents discharges for various recurrence intervals and the resulting theoretical hydraulic calculations using the

TABLE I

THEORETICAL HYDRAULIC CALCULATIONS USING HEC2
FOR PROPOSED EARTH LINED CHANNEL
1000 FEET UPSTREAM FROM MCDOWELL ROAD BRIDGE

Recurrence Interval, Years	Discharge, cfs	Average Velocity, fps	Flow Depth, ft.	Froude No.
10	16,000	5.37	3.19	0.53
25	49,000	7.47	6.39	0.52
50	69,000	8.41	7.84	0.53
100	91,000	9.29	9.23	0.54

the HEC-2 computer model. As can be seen, there is no change in the Froude No. for the various frequency levels of flooding. We can conclude that the Froude No. would be the same for smaller events. Such a Froude No. suggests that there is a strong tendency for the channel to meander.

Leopold et al (1964) discusses frequency concepts related to geomorphic processes and concludes that small and intermediate flood events are responsible for most of the sediment transport in streams. Scanty data that they were able to obtain, suggests that 80 to 95 percent of a stream's total sediment transport resulted from events that occurred one day per year. Although major flooding events are important in modifying the fluvial regime of rivers, they occur so infrequently that over a long period of time they have only a minor effect on the total sediment moved. Short term, frequent events, although they have shorter durations, tend to move the bulk of all sediment transported.

This is expected to be the case with the Agua Fria River. The River is an ephemeral stream in the vicinity of the project site, flowing only in response to occasional local thunderstorms or infrequent general winter storms. During periods of moderate storm rainfalls, intermediate to low runoff events will result in rapid modification of the proposed realigned Agua Fria River. The rate that the channel will be modified can not be determined. However, it can be stated that with any moderate runoff event lasting for several days, substantial reworking of the channel will result, prior

to reaching the peak discharge of the storm event. Sediment entrainment primarily occurs during the rising limb of the flood hydrograph and not at the peak. Sedimentation, particularly in long term aggrading streams, occurs on the falling limb of the flood hydrograph. It is conceivable that during an average runoff year, the realigned Agua Fria River channel may be substantially modified so that a slope similar to its natural slope would be established.

In order to establish the upper limit Q beyond which shifting and meander of the proposed unlined channel would occur, we estimate that a single event 24 hour storm with a peak discharge of 5,000 cfs might be accommodated without major bank erosion. Larger particles of the parent materials would not be entrained and some armoring would be expected for 5,000 cfs or less. Meandering would occur over the 1,100 feet invert of the realigned channel but would mostly be contained within the proposed channel for the hypothetical single event storm.

A succession of such events over a winter period would, however, result in major shifting and modification of the proposed realigned channel. If the channel were repaired and restored after each event (say less than a peak Q of 5,000 cfs), it might be possible to operate with the proposed channel for an unknown period of time. Larger events or a succession of small events in rapid order so that the channel could not be restored, of course, would defeat a concept of restoration.

It is necessary to point out that the above estimates were made with approximate methods. If the unlined presently proposed channel was to be considered , a more definitive analysis would be required with a significant expansion of the original scope of this study.

V. Mathematical Model

5.1 Methodology

The water surface profiles and bridge losses were computed with the aide of the HEC-2 computer program, developed in the Hydrologic Engineering Center, Corps of Engineers, Davis, California, by Bill S. Eichert. The computational procedure is similar to Method 1, Backwater Curves in River Channels, Engineering Manual 1110-2-1409, U.S. Army Corps of Engineers, 7 December 1959.

This method applies Bernoulli's Theorem for the total energy at each cross section and Manning's formula for the friction head loss between cross sections. In the program, average friction slope for a reach between two cross sections is determined in terms of the average of the conveyances at the two ends of the reach. Other losses are computed using one of several methods. The critical water surface elevation corresponding to the minimum specific energy is computed using an iterative process. The energy losses caused by bridges are computed in two parts. First, the losses due to expansion and contraction of the cross section on the upstream and downstream side of the structure are computed,

then secondly the special routine computes losses through the structure for low flow, weir flow and pressure flow or for any combination of these. The type of flow is determined by a series comparisons. First, the energy grade line elevations are computed assuming alternately low flow and pressure flow control. The higher energy grade line elevation determines the appropriate type of flow. If pressure flow appears to control and the energy grade line is above the minimum top of roadway elevation, then a combination of pressure flow and weir flow exists. If the energy gradient is below the minimum top of roadway, then pressure flow alone controls. If a low flow appears to control, and the corresponding energy gradient elevation is above the minimum top of roadway elevation, then a combination of low flow under the bridge and weir flow over the roadway approach exists. If the energy elevation is below the minimum top of roadway, then low flow controls.

5.2 Assumptions

a. The starting elevation for the water surface profile computation was obtained from the A.D.O.T. to be 979.91 at the I-10 Bridge, from their analysis of 100,000 cfs flow.

b. The I-10 Bridge opening was assumed to be 1500' wide.

c. No dyking between I-10 and McDowell Road.

d. Debris width = 1/2 pier diameter on each side of the piers.

TABLE II

HEC-2 RESULTS

SUMMARY

Q = 91,000 CFS

Sec. No.	Existing Cond. W/O I-10 Bridge	I-10 Bridge + Channel Improv. Only	I-10 Bridge Channel + Bridge Improvements
5.55	79.9/9.3*	79.9/9.9	79.90/9.9
5.82	82.3/7.6	83.5/7.2	83.48/7.2
5.85	-	85.16/9.3	85.16/9.3
Bridge	-	-	84.92/9.22
5.86	-	85.25/8.7	85.50/8.5 + 0.25
6.33	85.44/7.9	85.78/9.5	85.97/9.3 + 0.19
6.71	88.59/12.8	86.67/11.3	86.78/11.1 + 0.11
6.96	91.96/8.3	88.42/11.8	88.43/11.8 + 0.01
7.12	93.9/7.2	89.91/11.8	89.91/11.8 + 0
7.36	96.4/12.0	91.90/11.9	91.90/11.9 + 0
7.65	99.78/8.8	93.71/13.7	93.69/13.7 + 0
7.89	102.81/6.6	100.37/10.3	100.39/10.3

* H.G.L. Elevation/Velocity (fps)

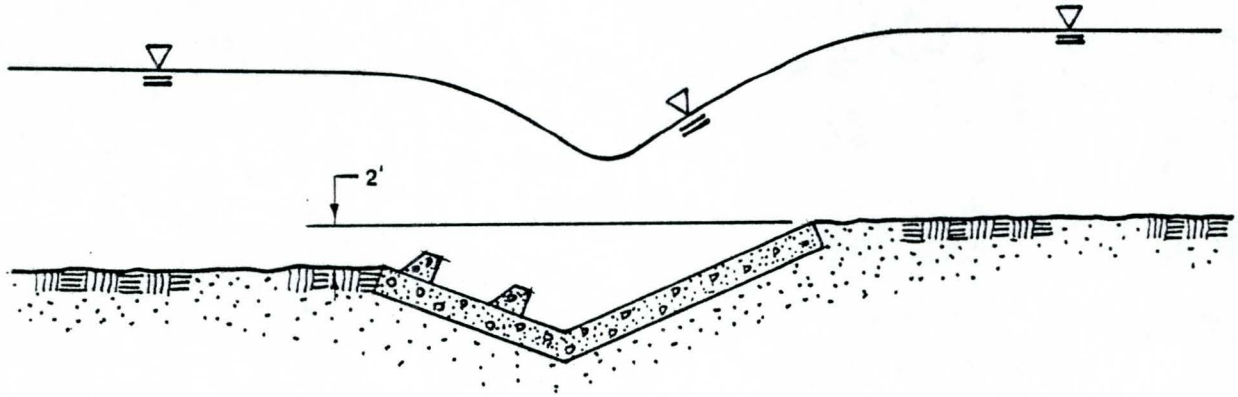
VI. Suggested Alternative Designs

Assuming the proposed alignment of the McDowell Road is fixed, alternatives for rechannelization of Agua Fria River range from complete lining to accepting the likely consequence of the proposed earth structure. Even a thin walled concrete channel would be a marginal design considering soils of the region. Differential settlement and possibly localized groundwater might jeopardize such an approach. Assuming such a design were feasible, total 1982 project costs might exceed $30 million.

The most feasible alternative from an economic standpoint is probably one that can utilize an earthlined channel. To do this, however, will require substantial reduction in the velocity from that anticipated in the proposed channel. There are two basic ways to achieve this: (1) enlarge and lengthen the channel or (2) enlarge and decrease the slope of the channel. The first method would essentially be to force meanders in the channel where the engineer wants them and hope they will remain stable. This method is not recommended. The second method is recommended, and consists of constructing drop structures in the channel invert. Local bank rip rap will be required to maintain the integrity of the drop structures. Only two drop structures should be required two feet in height to achieve the desired slope. Flow area would have to be increased by about 20% (e.g. widen proposed channel to 1300 feet). Drop structures need not be massive vertical type structures but could be prone as shown on the attached sketch.

They could be constructed from large angular blocks and gunnited as well as constructed from concrete. Stilling blocks are advisable on the downstream apron to ensure that flows return to a tranquil state.

The proposed alternative would probably not exceed a 1982 project cost of $8 million. Further, conceptual as well as detailed studies are required to firm up alternatives and their costs.



SCHEMATIC DIAGRAM OF PRONE DROP STRUCTURE

Lowry & Associates

HEC-2 RESULTS FOR
EXISTING CONDITIONS
Q = 91,000 cfs

****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****
****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****
****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****
****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****
****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****
****A	END	JOB 1004	#SWC02A	AGUA FRIA RIVER		ROOM HOLD	1.07.03 PM 26 APR 82	R17.PR1	SYS H168	JOB 1004	END	A****

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*****************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
*****************************************

T1      AGUA FRIA CHANNEL * I-10 TO INDIAN SCHOOL ROAD *
T2      EXISTING CONDITIONS *  FOR 1981 CONTOURS *
T3      Q=91000 CFS

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     0.       0.       0.       0.   0.0          0.0      0.0   91000.   979.900   0.0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IDW      CHNIM    ITRACE

    1.000    10.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0     15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

   120.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

NC     0.045    0.040    0.035    0.100    0.300    0.0      0.0      0.0      0.0      0.0

X1     5.550   29.000 10000.000 10000.000    0.0      0.0      0.0      0.0      0.0      0.0
GR   990.000 8400.000  988.000 8500.000  986.000 8650.000  984.000 8900.000  982.000 9070.000
GR   980.000 9210.000  980.000 9260.000  978.000 9300.000  976.000 9310.000  974.000 9320.000
GR   972.000 9325.000  970.000 9330.000  968.000 9340.000  968.000 9410.000  970.000 9420.000
GR   972.000 9690.000  972.000 9800.000  970.000 9820.000  972.000 9940.000  973.000 10000.000
GR   974.000 10170.000 976.000 10760.000 978.000 11830.000 980.000 12560.000 980.000 13210.000
GR   980.000 14380.000 982.000 14570.000 984.000 14700.000 986.000 14950.000   0.0     0.0

X1     5.820   35.000 10000.000 10000.000 1050.000  900.000 1000.000    0.0      0.0      0.0
GR   990.000 8140.000  988.000 8420.000  986.000 8700.000  984.000 9040.000  982.000 9050.000
GR   980.000 9060.000  978.000 9065.000  976.000 9070.000  974.000 9080.000  972.000 9090.000
GR   970.000 9110.000  968.000 9115.000  966.000 9130.000  966.000 9160.000  968.000 9180.000
GR   970.000 9190.000  972.000 9210.000  974.000 9220.000  974.000 9280.000  972.000 9340.000
GR   972.000 9770.000  973.000 10000.000 974.000 10100.000 976.000 10340.000 978.000 10350.000
GR   980.000 11100.000 980.000 11650.000 980.000 12000.000 982.000 12630.000 980.000 13040.000
GR   980.000 14070.000 982.000 14260.000 984.000 14460.000 986.000 14630.000 987.000 15200.000

X1     6.330   42.000 10000.000 10000.000 2000.000 1600.000 1800.000    0.0      0.0      0.0
GR   994.000 6690.000  992.000 7090.000  990.000 7320.000  988.000 7410.000  986.000 7630.000
GR   984.000 7650.000  982.000 8090.000  982.000 9700.000  982.000 10000.000 982.000 10220.000
GR   982.000 10460.000 980.000 10480.000 982.000 10620.000 982.000 10990.000 980.000 11010.000
GR   978.000 11020.000 978.000 11050.000 980.000 11060.000 982.000 11070.000 982.000 11110.000
GR   980.000 11315.000 978.000 11320.000 976.000 11350.000 976.000 11480.000 978.000 11570.000
GR   980.000 11590.000 982.000 11650.000 984.000 11690.000 986.000 11710.000 986.000 11730.000
GR   984.000 11735.000 982.000 11740.000 980.000 11750.000 980.000 11780.000 982.000 11840.000
```

GR	984.000	11900.000	982.000	12440.000	982.000	13420.000	984.000	13435.000	986.000	13460.000
GR	988.000	13700.000	990.000	13950.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	6.710	44.000	10000.000	10000.000	1100.000	1300.000	1600.000	0.0	0.0	0.0
GR	994.000	6200.000	992.000	6220.000	990.000	6860.000	988.000	6890.000	986.000	6940.000
GR	986.000	8080.000	985.000	8085.000	986.000	8090.000	986.000	8620.000	985.000	8730.000
GR	986.000	9740.000	986.000	10000.000	986.000	10880.000	986.000	11020.000	988.000	11050.000
GR	990.000	11060.000	990.000	11090.000	988.000	11095.000	988.000	11180.000	990.000	11185.000
GR	990.000	11200.000	988.000	11210.000	986.000	11215.000	986.000	11240.000	984.000	11250.000
GR	982.000	11255.000	980.000	11280.000	978.000	11300.000	976.000	11330.000	974.000	11360.000
GR	974.000	11420.000	976.000	11430.000	978.000	11440.000	978.000	11500.000	980.000	11510.000
GR	982.000	11720.000	984.000	11725.000	986.000	11730.000	988.000	11740.000	988.000	11820.000
GR	990.000	12430.000	992.000	12640.000	994.000	12770.000	996.000	12970.000	0.0	0.0
X1	6.960	26.000	10000.000	10000.000	900.000	1300.000	1300.000	0.0	0.0	0.0
GR	994.000	5700.000	992.000	6100.000	990.000	6500.000	988.000	6560.000	988.000	7160.000
GR	988.000	9130.000	989.000	10000.000	990.000	10280.000	990.000	10770.000	990.000	10845.000
GR	992.000	10850.000	992.000	10890.000	990.000	10900.000	988.000	10910.000	986.000	10930.000
GR	986.000	10950.000	984.000	10960.000	982.000	10970.000	982.000	11080.000	982.000	11260.000
GR	984.000	11340.000	986.000	11350.000	988.000	11360.000	990.000	11370.000	992.000	11430.000
GR	994.000	11680.000	996.000	11920.000	998.000	12215.000	0.0	0.0	0.0	0.0
X1	7.120	26.000	10000.000	10000.000	950.000	900.000	920.000	0.0	0.0	0.0
GR	1000.000	5000.000	998.000	5510.000	996.000	5930.000	994.000	6250.000	992.000	6810.000
GR	990.000	6880.000	988.000	6900.000	988.000	7130.000	990.000	8610.000	992.000	9920.000
GR	992.000	10000.000	992.000	10300.000	990.000	10370.000	990.000	10480.000	988.000	10490.000
GR	986.000	10510.000	984.000	10840.000	984.000	10950.000	986.000	11120.000	988.000	11125.000
GR	990.000	11130.000	990.000	11200.000	992.000	11220.000	994.000	11400.000	996.000	11430.000
GR	998.000	11680.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	7.360	41.000	10000.000	10000.000	1100.000	1250.000	1250.000	0.0	0.0	0.0
GR	1004.000	4940.000	1002.000	5630.000	1000.000	6060.000	998.000	6110.000	996.000	6500.000
GR	994.000	7100.000	994.000	9250.000	996.000	9860.000	996.000	9880.000	994.000	9900.000
GR	992.000	9910.000	992.000	9960.000	992.000	10000.000	992.000	10060.000	990.000	10070.000
GR	988.000	10090.000	986.000	10110.000	986.000	10130.000	988.000	10150.000	990.000	10160.000
GR	996.000	10170.000	990.000	10190.000	988.000	10200.000	986.000	10215.000	984.000	10235.000
GR	984.000	10310.000	982.000	10325.000	984.000	10340.000	986.000	10370.000	986.000	10400.000
GR	988.000	10470.000	990.000	10540.000	990.000	10710.000	990.000	10740.000	992.000	10810.000
GR	993.000	11000.000	994.000	11110.000	994.000	11400.000	996.000	11450.000	998.000	11470.000
GR	1000.000	11830.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	7.650	15.000	10000.000	10000.000	850.000	1200.000	1150.000	0.0	0.0	0.0
GR	1002.000	5860.000	1000.000	5990.000	1000.000	6240.000	998.000	6780.000	996.000	7190.000
GR	998.000	9090.000	998.000	9970.000	997.000	10000.000	996.000	10010.000	994.000	10020.000
GR	992.000	10070.000	992.000	10310.000	992.000	10520.000	990.000	10620.000	990.000	10930.000

X1	7.885	32.000	10000.000	10000.000	1750.000	1450.000	1500.000	0.0	0.0	0.0
GR	1017.000	5550.000	1012.000	5620.000	1010.000	5640.000	1008.000	6150.000	1010.000	6350.000
GR	1010.000	6400.000	1008.000	6550.000	1006.000	6680.000	1004.000	6810.000	1002.000	6850.000
GR	1000.000	7240.000	1000.000	8620.000	998.000	8660.000	998.000	8930.000	1000.000	9170.000
GR	1000.000	9620.000	998.000	9630.000	1000.000	9950.000	1000.000	10000.000	1000.000	10010.000
GR	998.000	10020.000	996.000	10030.000	994.000	10040.000	994.000	10100.000	994.000	10150.000
GR	992.000	10490.000	992.000	10790.000	990.000	10800.000	990.000	10820.000	996.000	10840.000
GR	990.000	10860.000	990.000	11050.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	8.180	37.000	10000.000	10000.000	1650.000	1550.000	1580.000	0.0	0.0	0.0
GR	1013.500	6430.000	1010.000	6520.000	1010.000	6630.000	1012.000	6890.000	1010.000	6910.000
GR	1010.000	7320.000	1008.000	7330.000	1006.000	7340.000	1004.000	7360.000	1002.000	8410.000
GR	1004.000	8420.000	1004.000	8430.000	1002.000	8600.000	1004.000	8660.000	1006.000	8684.000
GR	1006.000	9370.000	1008.000	9390.000	1000.000	9450.000	1000.000	9560.000	999.000	9570.000
GR	1000.000	9580.000	1002.000	9585.000	1004.000	9680.000	1006.000	9760.000	1006.000	9970.000
GR	1005.000	10000.000	1004.000	10060.000	1002.000	10070.000	1000.000	10100.000	998.000	10160.000
GR	996.000	10170.000	994.000	10180.000	994.000	10400.000	996.000	10520.000	998.000	10550.000
GR	1000.000	10600.000	1000.000	11000.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	8.190	40.000	9730.000	10090.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	1018.000	6900.000	1018.000	7000.000	1010.000	7000.102	1007.500	7180.000	1006.000	7360.000
GR	1004.000	7540.000	1004.000	8080.000	1005.000	8260.000	1004.700	8440.000	1004.000	8540.000
GR	1005.500	8620.000	1005.000	8800.000	1004.000	8980.000	1005.000	9340.000	1005.000	9600.000
GR	1004.000	9730.000	1001.000	9880.000	996.000	9950.000	995.000	10000.000	1003.000	10090.000
GR	1003.000	10220.000	1004.000	10310.000	1004.000	10600.000	1003.000	10810.000	1002.000	11000.000
GR	1005.500	11100.000	1003.000	11190.000	1003.500	11360.000	1003.000	11540.000	1003.000	11810.000
GR	1004.000	11900.000	1004.700	12090.000	1003.500	12260.000	1003.500	12440.000	1003.000	12610.000
GR	1003.000	12800.000	1005.500	12900.000	1006.000	12960.000	1018.000	12960.102	1018.000	13100.000
SB	1.050	15.500	2.700	0.0	6000.000	1100.000	22150.000	0.0	993.000	993.000
X1	8.200	0.0	0.0	0.0	15.000	15.000	15.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BT	6.000	6900.000	1018.000	0.0	7000.000	1018.000	0.0	7000.102	1017.000	1010.000
BT	12960.000	1014.000	1007.000	12960.102	1018.000	0.0	15100.000	1018.000	0.0	0.0
X1	8.210	23.000	5550.000	5610.000	50.000	50.000	50.000	0.0	0.0	0.0
GR	1012.000	2500.000	1008.000	2770.000	1004.000	3690.000	1003.000	4000.000	1004.000	4700.000
GR	1005.000	5000.000	1004.000	5330.000	1000.000	5340.000	1000.000	5420.000	1002.000	5500.000
GR	1000.000	5550.000	996.000	5610.000	995.000	5630.000	996.000	5650.000	1000.000	5700.000
GR	1004.000	6430.000	1004.000	6630.000	1003.000	7300.000	1004.000	7460.000	1004.000	8400.000
GR	1008.000	8560.000	1012.000	8670.000	1016.000	9810.000	0.0	0.0	0.0	0.0

X1	8.215	35.000	10000.000	10000.000	80.000	80.000	80.000	0.0	0.0	0.0
GR	1013.700	6370.000	1011.500	6660.000	1010.000	6870.000	1008.000	6930.000	1008.000	7050.000
GR	1006.000	7240.000	1008.000	7300.000	1010.000	7330.000	1010.000	7350.000	1008.000	7370.000
GR	1006.000	7380.000	1004.000	7450.000	1004.000	8440.000	1006.000	9160.000	1004.000	9270.000
GR	1002.000	9480.000	1000.000	9550.000	1000.000	9570.000	990.000	9620.000	980.000	9640.000
GR	980.000	9920.000	990.000	9960.000	1000.000	9980.000	1000.000	10000.000	1000.000	10160.000
GR	998.000	10180.000	996.000	10200.000	996.000	10480.000	996.000	10560.000	1000.000	10570.000
GR	1010.000	10630.000	1010.000	10670.000	1020.000	10690.000	1010.000	10840.000	1010.000	10960.000
X1	8.410	37.000	10000.000	10000.000	950.000	1000.000	1000.000	0.0	0.0	0.0
GR	1016.000	6860.000	1018.000	7150.000	1018.000	7330.000	1016.000	7400.000	1014.000	7420.000
GR	1012.000	7440.000	1010.000	7460.000	1008.000	7480.000	1006.000	7490.000	1006.000	9220.000
GR	1004.000	9400.000	1002.000	9420.000	1002.000	9470.000	1004.000	9510.000	1006.000	9540.000
GR	1008.000	9600.000	1010.000	9610.000	1016.000	9625.000	1016.000	9660.000	1010.000	9670.000
GR	1006.000	9700.000	1000.000	9730.000	998.000	9750.000	997.000	9950.000	999.000	10000.000
GR	1000.000	10060.000	1010.000	10090.000	1010.000	10140.000	1000.000	10160.000	1000.000	10570.000
GR	1010.000	10590.000	1010.000	10620.000	1000.000	10650.000	990.000	10700.000	980.000	10750.000
GR	978.000	10880.000	980.000	11000.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	8.500	26.000	10000.000	10000.000	450.000	490.000	480.000	0.0	0.0	0.0
GR	1020.000	6700.000	1018.000	6730.000	1016.000	7000.000	1014.000	7040.000	1012.000	7115.000
GR	1010.000	7200.000	1010.000	7280.000	1008.000	7290.000	1006.000	7360.000	1006.000	8880.000
GR	1008.000	9090.000	1010.000	9200.000	1008.000	9300.000	1008.000	9650.000	1010.000	9670.000
GR	1010.000	9730.000	1008.000	9900.000	1008.000	10000.000	1010.000	10010.000	1000.000	10130.000
GR	998.000	10300.000	998.000	10470.000	1000.000	10660.000	1000.000	10770.000	1010.000	10830.000
GR	1010.000	10860.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 1

CCHV=   0.100 CEHV=   0.300
*SECNO 5.550
     5.55     11.90    979.90      0.0    979.90    980.67      0.77      0.0       0.0    973.00
   91000.    49639.       0.    41361.     6038.       0.     7741.       0.        0.    973.00
     0.0      8.22      0.0      5.34     0.045     0.035     0.040      0.0    968.00   9281.00
 0.003420       0.        0.       0.         0         0         0      0.0   3242.46  12523.46

FLOW DISTRIBUTION FOR SECNO=      5.55          CWSEL=    979.90

STA=    9281.    9410.    9690.    9800.    9840.   10000.   10170.   10760.   11830.   12523.
  PER Q=     11.4     23.0      7.3      3.2      9.5      9.0     19.9     15.1      1.5
   AREA=   1117.0   2512.0    869.0    356.0   1184.0   1088.0   2890.9   3102.9    658.8
    VEL=      9.3      8.3      7.7      8.3      7.3      7.5      6.3      4.4      2.1

*SECNO 5.820
     5.82     16.32    982.32      0.0      0.0    982.69      0.38      1.98      0.04    973.00
   91000.    56163.       0.    34817.    9746.       0.    11274.      387.       91.    973.00
     0.06      5.76      0.0      3.09    0.045     0.035     0.040     0.035    966.00   9048.41
 0.001315     1050.     1000.     900.        3         0         0      0.0   5243.25  14291.66

FLOW DISTRIBUTION FOR SECNO=      5.82          CWSEL=    982.32

STA=    9048.    9115.    9160.    9190.    9280.    9340.    9770.   10000.   10100.   10340.   11100.   11650.   12630.
  PER Q=      3.0      6.0      3.4      4.7      3.3     27.7     13.6      5.6      9.8      8.4      3.3      3.6
   AREA=    515.6    719.2    439.5    818.5    559.0   4436.1   2257.8    881.7   1756.0   2540.6   1274.1   1640.3
    VEL=      5.3      7.6      7.1      5.3      5.3      5.7      5.5      5.7      5.1      3.0      2.4      2.0
STA=   12630.   14070.   14292.
  PER Q=      7.1      0.4
   AREA=   2925.9    255.2
    VEL=      2.2      1.6

*SECNO 6.330

3265 DIVIDED FLOW

     6.33      9.44    985.44      0.0      0.0    985.75      0.31      3.05      0.01    982.00
   91000.    26951.       0.    64049.    7654.       0.    13247.     1236.      308.    982.00
     0.17      3.52      0.0      4.84    0.045     0.035     0.040     0.035    976.00   7635.60
 0.002325     2000.     1800.    1600.        3         0         0      0.0   5790.39  13453.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

FLOW DISTRIBUTION FOR SECNO=      6.33          CWSEL=    985.44

STA=    7636.    8090.    9700.   10000.   10220.   10460.   10620.   10990.   11060.   11315.   11480.   11570.   11780.
  PER Q=      3.4     22.1      4.1      3.4      3.7      3.8      5.7      3.0      5.7     13.1      6.2      3.9
   AREA=   1083.9   5538.0   1031.9    756.7    825.5    710.4   1272.7    440.8   1092.1   1512.6    759.6    725.5
    VEL=      2.9      3.6      3.6      4.1      4.1      4.8      4.1      6.2      4.7      7.9      7.4      4.9
STA=   11780.   12440.   13420.   13453.
  PER Q=      6.6     15.1      0.2
   AREA=   1730.2   3371.0     49.6
    VEL=      3.5      4.1      2.8

*SECNO 6.710

3265 DIVIDED FLOW

     6.71     14.59    988.59      0.0      0.0    989.26     0.67     3.40     0.11   986.00
   91000.    32209.       0.   58791.    8576.       0.    7632.    1753.     458.   986.00
     0.22      3.76      0.0     7.70    0.045    0.035    0.040    0.038   974.00  6881.13
 0.003310     1100.    1600.    1300.        2        0        0      0.0  5052.98 12000.25

FLOW DISTRIBUTION FOR SECNO=      6.71          CWSEL=    988.59

STA=    6881.    8060.    8620.    9740.   10000.   10880.   11280.   11330.   11360.   11420.   11440.   11500.   11720.
  PER Q=     11.9      5.5     15.3      2.7     10.1      4.3      6.2      5.4     12.3      3.2      7.2     15.5
   AREA=   3035.9   1404.1   3461.9    673.7   2280.1    789.7    539.5    407.7    875.5    251.8    635.5   1690.0
    VEL=      3.6      3.6      4.0      3.6      4.0      4.9     10.5     12.2     12.8     11.5     10.3      8.3
STA=   11720.   12000.
  PER Q=      0.5
   AREA=    162.4
    VEL=      2.7

*SECNO 6.960

3265 DIVIDED FLOW

     6.96      9.96    991.96      0.0      0.0    992.35     0.40     3.07     0.03   989.00
   91000.    52736.       0.   38264.   13745.       0.    6028.    2187.     580.   989.00
     0.29      3.84      0.0     6.35    0.045    0.035    0.040    0.039   982.00  6108.19
 0.002329      900.    1300.    1300.        1        0        0      0.0  5280.27 11428.77
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LLFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 FLOW DISTRIBUTION FOR SECNO=      6.96          CWSEL=    991.96

 STA=    6108.    7160.    9130.   10000.   10770.   10970.   11080.   11260.   11340.   11429.
   PER Q=     11.7     34.2     12.1      5.4      3.2     10.0     16.3      6.1      1.0
    AREA=   2936.8   7799.3   3009.4   1648.5    568.4   1095.5   1792.6    716.7    206.3
     VEL=      3.6      4.0      3.6      3.0      5.1      8.3      8.3      7.7      4.4

 *SECNO 7.120
      7.12     9.87   993.87      0.0      0.0   994.23     0.36     1.87     0.00   992.00
    91000.   47217.       0.   43783.   13234.       0.    7431.    2621.     691.   992.00
      0.34     3.57      0.0     5.89    0.045    0.035    0.040    0.038   984.00  6288.00
  0.001769     950.     920.     900.        2        0        0      0.0  5099.78 11387.78

 FLOW DISTRIBUTION FOR SECNO=      7.12          CWSEL=    993.87

 STA=    6288.    7130.    8610.    9920.   10000.   10480.   10840.   10950.   11120.   11388.
   PER Q=      8.4     31.5     11.6      0.3      3.9     22.6      8.6     11.1      1.9
    AREA=   2133.1   7199.1   3752.2    149.1   1184.8   3111.1   1085.1   1506.9    542.8
     VEL=      3.6      4.0      2.8      2.1      3.0      6.6      7.2      6.7      3.2

 *SECNO 7.360
      7.36    14.39   996.39      0.0      0.0   997.19     0.80     2.82     0.13   992.00
    91000.   23775.       0.   67225.    7300.       0.    8301.    3106.     824.   992.00
      0.39     3.26      0.0     8.10    0.045    0.035    0.040    0.038   982.00  6423.94
  0.003339    1100.    1250.    1250.        2        0        0      0.0  5029.96 11453.90

 FLOW DISTRIBUTION FOR SECNO=      7.36          CWSEL=    996.39

 STA=    6424.    9250.    9960.   10000.   10090.   10130.   10190.   10235.   10310.   10340.   10370.   10400.   10470.
   PER Q=     21.5      3.7      1.0      3.4      4.3      3.1      4.8     11.7      5.3      4.1      3.5      6.9
    AREA=   5987.4   1136.9    175.6    465.1    395.6    363.4    442.6    929.3    401.7    341.7    311.7    657.3
     VEL=      3.3      3.0      5.1      6.6      9.9      7.8      9.9     11.5     12.0     10.9     10.2      9.6
 STA=   10470.   10540.   10710.   10810.   11000.   11400.   11454.
   PER Q=      4.6      8.8      4.3      4.3      4.4      0.2
    AREA=    517.3   1086.3    569.0    739.1   1011.0     70.3
     VEL=      8.1      7.4      6.9      5.3      4.0      2.7

 *SECNO 7.650
 3280 CROSS SECTION      7.65 EXTENDED      9.78 FEET

      7.65     9.78   999.78      0.0      0.0  1000.56     0.77     3.37     0.00   997.00
    91000.   27087.       0.   63913.    8473.       0.    7827.    3482.     928.   997.00
      0.44     3.20      0.0     8.17    0.045    0.035    0.040    0.038   990.00  6300.25
  0.002808     850.    1150.    1200.        2        0        0      0.0  4829.75 10930.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

FLOW DISTRIBUTION FOR SECNO=      7.65          CWSEL=    999.78

STA=    6300.    7190.    9090.    9970.   10000.   10070.   10310.   10520.   10620.   10930.
  PER Q=      5.1     20.0      4.4      0.2      3.1     15.9     13.9      8.1     29.4
   AREA=   1564.8   5276.0   1563.6     68.3    419.4   1866.4   1633.1    877.7   3030.8
    VEL=      3.0      3.5      2.6      3.0      6.7      7.7      7.7      8.4      8.8

*SECNO 7.885
3280 CROSS SECTION      7.89 EXTENDED      12.81 FEET

     7.89    12.81  1002.81      0.0      0.0  1003.27     0.46     2.68     0.03  1000.00
   91000.   23843.       0.   67157.    9618.       0.   10950.    4158.     1099.  1000.00
     0.52     2.48      0.0     6.13    0.045    0.035    0.040    0.037   990.00  6833.80
 0.001189    1750.    1500.    1450.        3        0        0      0.0  4216.20 11050.00

FLOW DISTRIBUTION FOR SECNO=      7.89          CWSEL=   1002.81

STA=    6834.    8620.    8930.    9620.    9950.   10000.   10100.   10490.   10790.   10840.   11050.
  PER Q=     11.0      5.1      5.9      3.8      0.4      4.1     24.2     22.3      4.1     19.2
   AREA=   4590.1   1451.1   2178.8   1257.3    140.5    731.0   3775.9   3243.0    570.5   2630.1
    VEL=      2.2      3.2      2.5      2.8      2.3      5.1      5.8      6.3      6.5      6.6

*SECNO 8.180

3265 DIVIDED FLOW

3280 CROSS SECTION      8.18 EXTENDED      5.43 FEET

3301 HV CHANGED MORE THAN HVINS

     8.18    11.42  1005.42      0.0      0.0  1006.70     1.28     3.19     0.25  1005.00
   91000.   18473.       0.   72527.    4289.       0.    7297.    4746.     1227.  1005.00
     0.57     4.31      0.0     9.94    0.045    0.035    0.040    0.037   994.00  7345.73
 0.004194    1650.    1580.    1550.        2        0        0      0.0  2071.94 11000.00

FLOW DISTRIBUTION FOR SECNO=      8.18          CWSEL=   1005.42

STA=    7346.    8410.    9450.    9560.   10000.   10160.   10400.   10520.   10600.   11000.
  PER Q=     10.8      3.0      4.3      2.1      4.7     35.9     15.8      5.7     17.6
   AREA=   2558.1    719.3    596.9    414.6    598.2   2702.4   1251.2    574.1   2170.6
    VEL=      3.9      3.8      6.6      4.6      7.2     12.1     11.5      9.0      7.4
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 8.190
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     8.19     11.23  1006.23  1006.23      0.0   1007.27      1.04      0.27      0.02   1004.00
   91000.    15688.    27676.    47636.    3948.     2287.     7736.     4760.     1232.   1003.00
     0.57      3.97     12.10      6.16    0.045     0.035     0.040     0.037    995.00   7332.52
 0.006914       50.       50.       50.       20         6         0       0.0   5627.48  12960.00

FLOW DISTRIBUTION FOR SECNO=       8.19          CWSEL=    1006.23

STA=    7333.    8080.    8540.    9340.    9730.   10090.   10220.   10600.   10810.   11000.   11360.   11540.   11810.
  PER Q=      7.0      3.1      5.0      2.1     30.4      3.1      5.4      3.8      5.8      6.1      3.8      6.5
   AREA=   1428.0    747.4   1228.2    544.3   2287.4    419.8    892.0    573.1    708.5    932.4    536.2    871.8
    VEL=      4.4      3.8      3.7      3.5     12.1      6.7      5.5      6.0      7.4      5.9      6.4      6.7
STA=   11810.   12090.   12440.   12610.   12800.   12960.
  PER Q=      3.5      5.3      3.6      4.5      1.1
   AREA=    602.6    853.2    506.4    613.5    226.6
    VEL=      5.2      5.6      6.4      6.7      4.5

SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05     15.50      2.70      0.0    6000.00   1100.00  22150.00      0.0     993.00    993.00

*SECNO 8.200
CLASS A LOW FLOW

3420 BRIDGE W.S.=   1006.22 BRIDGE VELOCITY=,      1.41      CALCULATED CHANNEL AREA=,    64764.

 EGPRS     EGLWC      H3        QWEIR     QPR       BAREA   TRAPEZOID      ELLC      ELTRD
                                                             AREA
     0.0   1007.41     0.54        0.    91000.    22150.    83300.     1010.00   1014.00


     8.20     11.77  1006.77      0.0       0.0   1007.41      0.64      0.14      0.0   1004.00
   91000.    18725.    23933.    48342.    5265.     2483.     9292.     4766.     1234.   1003.00
     0.57      3.56      9.64      5.20    0.045     0.035     0.040     0.037    995.00   7267.48
 0.003936       15.       15.       15.        0         0         0       0.0   5692.53  12960.00

FLOW DISTRIBUTION FOR SECNO=       8.20          CWSEL=    1006.77
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        VLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

STA=    7267.     8080.     8540.     8980.     9340.     9730.    10090.    10220.    10600.    10810.    11000.    11360.    11540.
  PER Q=      7.8       3.8       3.0       3.2       2.7      26.3       3.0       5.7       3.9       5.5       6.2       3.8
   AREA=   1850.8     996.7     844.2     817.6     755.7    2482.6     490.2    1098.0     686.9     811.5    1127.6     633.8
    VEL=      3.8       3.5       3.3       3.6       3.2       9.6       5.6       4.7       5.1       6.1       5.0       5.4
STA=   11540.   11810.   12090.   12440.   12610.   12800.   12960.
  PER Q=      6.3       3.8       5.6       3.5       4.4       1.4
   AREA=   1018.2     754.4    1042.9     598.6     716.5     313.4
    VEL=      5.6       4.6       4.9       5.4       5.6       3.9

*SECNO 8.210
     8.21     12.24   1007.24       0.0       0.0   1007.59      0.35      0.15      0.03   1000.00
    91000.    30050.     4904.    56046.     8150.      554.    11761.     4787.     1240.    996.00
     0.57      3.69      8.85      4.77     0.045     0.035     0.040     0.037    995.00   2945.10
 0.002246       50.       50.       50.         2         0         0       0.0   5584.45   8529.35

FLOW DISTRIBUTION FOR SECNO=      8.21          CWSEL=   1007.24

STA=    2945.     4000.     4700.     5330.     5420.     5550.     5610.     5650.     5700.     6430.     7300.     8400.     8530.
  PER Q=      7.7      10.8       5.8       4.0       4.7       5.4       4.7       3.9      22.3      14.4      15.7       0.6
   AREA=   2365.4    2617.1    1725.4     631.5     811.0     554.3     469.5     461.9    3824.3    3152.7    3642.6     209.8
    VEL=      2.9       3.8       3.1       5.7       5.3       8.8       9.1       7.7       5.3       4.2       3.9       2.4

*SECNO 8.215

3265 DIVIDED FLOW

     8.22     27.42   1007.42       0.0       0.0   1007.67      0.24      0.07      0.01   1000.00
    91000.    69965.        0.    21035.    17275.        0.     5848.     4827.     1248.   1000.00
     0.58      4.05       0.0      3.60     0.045     0.035     0.040     0.037    980.00   7104.34
 0.000435       80.       80.       80.         2         0         0       0.0   3419.77  10614.55

FLOW DISTRIBUTION FOR SECNO=      8.22          CWSEL=   1007.42

STA=    7105.     8440.     9480.     9620.     9920.     9960.    10000.    10160.    10480.    10560.    10615.
  PER Q=      6.1       4.6       4.1      55.4       5.3       1.4       3.8      15.3       3.4       0.6
   AREA=   3692.3    2941.8    1219.5    8127.4     897.0     397.0    1188.0    3575.9     834.0     249.6
    VEL=      1.5       1.4       3.1       6.2       5.4       3.1       2.9       3.9       3.7       2.3

*SECNO 8.410
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        VLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3265 DIVIDED FLOW

3280 CROSS SECTION      8.41 EXTENDED      27.74 FEET

     8.41     29.73  1007.73       0.0       0.0   1008.19      0.46      0.46      0.07    999.00
   91000.    15052.       0.    75948.     7061.        0.    12922.     5308.     1323.    999.00
     0.63      2.13       0.0      5.88     0.045     0.035     0.040     0.037    978.00   7481.32
 0.000507      950.     1000.     1000.         2         0         0       0.0   3521.10  11000.00


FLOW DISTRIBUTION FOR SECNO=      8.41          CWSEL=   1007.73

STA=    7481.    9220.    9750.    9950.   10000.   10570.   10700.   10750.   10880.   11000.
  PER Q=      3.5      3.3      7.9      1.8     13.6      3.5      8.3     32.2     25.9
   AREA=   3009.3   1518.4   2047.0    486.8   3815.1    786.3   1136.8   3735.6   3448.2
    VEL=      1.1      2.0      3.5      3.4      3.2      4.0      6.6      7.9      6.8

*SECNO 8.500

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     8.50     10.05  1008.05  1008.05       0.0   1010.00      1.95      0.59      0.45   1008.00
   91000.    13534.       0.    77466.     3431.        0.     6435.     5471.     1356.   1008.00
     0.64      3.94       0.0     12.04     0.045     0.035     0.040     0.037    998.00   7289.75
 0.005908      450.      480.      490.        20        14         0       0.0   3045.25  10818.29
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HEC-2 RESULTS FOR REVISED
CONDITIONS WITH BRIDGE
AND CHANNEL
Q = 16,000 cfs
Q - 49,000 cfs
Q = 69,000 cfs
Q = 91,000 cfs

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*****************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
*****************************************

T1      AGUA FRIA CHANNEL * I-10 TO INDIAN SHCOOL ROAD *
T2 IMPROVED CHANNEL W/ N-VALUE=.018  WITH MCDOWELL RD BRIDGE
T3      1100 BOTTOM WIDTH 3:1 SIDE SLOPES Q10

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0.      2.       0.       0.   0.005000     0.0      0.0      0.     979.900    0.0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

    1.000     0.0     -1.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

   120.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

QT      4.000  16000.000  49000.000  69000.000  91000.000      0.0      0.0      0.0      0.0      0.0
NC      0.045      0.040      0.035      0.100      0.300      0.0      0.0      0.0      0.0      0.0

X1      5.550     29.000  10000.000  10000.000      0.0      0.0      0.0      0.0      0.0      0.0
X3      0.0        0.0     1500.000      0.0        0.0      0.0      0.0      0.0      0.0      0.0
GR    990.000   8400.000   988.000   8500.000   986.000   8650.000   984.000   8900.000   982.000   9070.000
GR    980.000   9210.000   980.000   9280.000   978.000   9300.000   976.000   9310.000   974.000   9320.000
GR    972.000   9325.000   970.000   9330.000   968.000   9340.000   968.000   9410.000   970.000   9420.000
GR    972.000   9690.000   972.000   9800.000   970.000   9820.000   972.000   9840.000   973.000  10000.000
GR    974.000  10170.000   976.000  10760.000   978.000  11830.000   980.000  12560.000   980.000  13210.000
GR    980.000  14380.000   982.000  14570.000   984.000  14700.000   986.000  14950.000     0.0       0.0

X1      5.820     35.000  10000.000  10000.000  1050.000   900.000  1000.000     0.0       0.0       0.0
GR    990.000   8140.000   988.000   8420.000   986.000   8700.000   984.000   9040.000   982.000   9050.000
GR    980.000   9060.000   978.000   9065.000   976.000   9070.000   974.000   9080.000   972.000   9090.000
GR    970.000   9110.000   968.000   9115.000   966.000   9130.000   966.000   9160.000   968.000   9180.000
GR    970.000   9190.000   972.000   9210.000   974.000   9220.000   974.000   9280.000   972.000   9340.000
GR    972.000   9770.000   973.000  10000.000   974.000  10100.000   976.000  10340.000   978.000  10350.000
GR    980.000  11100.000   980.000  11650.000   980.000  12000.000   982.000  12630.000   980.000  13040.000
GR    980.000  14070.000   982.000  14260.000   984.000  14460.000   986.000  14630.000   987.000  15200.000

X1      5.850      5.000  10000.000  10000.000   820.000   820.000   820.000     0.0       0.0       0.0
GR    986.450   9414.000   976.450   9450.000   975.450  10000.000   976.450  10550.000   986.450  10586.000
SB      1.050      1.600      2.600   1500.000  1100.000    90.000  11276.000     3.760   975.520   975.450
NC      0.018      0.018      0.018      0.100      0.300      0.0      0.0      0.0      0.0      0.0
```

X1	5.860	5.000	10000.000	10000.000	61.300	61.300	61.300	0.0	0.0	0.0
X2	0.0	0.0	1.000	986.640	990.000	0.0	0.0	1.330	0.0	0.0
GR	986.520	9414.000	976.520	9450.000	975.520	10000.000	976.520	10550.000	986.520	10586.000
X1	6.330	5.000	10000.000	10000.000	1100.000	930.000	1020.000	0.0	0.0	0.0
GR	990.640	9414.000	977.740	9450.000	976.740	10000.000	977.740	10550.000	990.640	10586.000
X1	6.710	5.000	10000.000	10000.000	1290.000	1290.000	1290.000	0.0	0.0	0.0
GR	992.700	9414.000	979.960	9450.000	978.960	10000.000	979.960	10550.000	992.700	10586.000
X1	6.960	5.000	10000.000	10000.000	1280.000	1280.000	1280.000	0.0	0.0	0.0
GR	994.750	9414.000	982.010	9450.000	981.010	10000.000	982.010	10550.000	994.751	10586.000
X1	7.120	5.000	10000.000	10000.000	950.000	950.000	950.000	0.0	0.0	0.0
GR	996.270	9414.000	983.530	9450.000	982.530	10000.000	983.530	10550.000	996.271	10586.000
X1	7.360	5.000	10000.000	10000.000	1250.000	1250.000	1250.000	0.0	0.0	0.0
GR	998.270	9414.000	985.530	9450.000	984.530	10000.000	985.530	10550.000	998.271	10586.000
X1	7.650	5.000	10000.000	10000.000	1150.000	1150.000	1150.000	0.0	0.0	0.0
GR	1000.100	9414.000	988.230	9450.000	987.230	10000.000	988.230	10550.000	1000.110	10586.000
NC	0.045	0.040	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	7.885	32.000	10000.000	10000.000	1750.000	1450.000	1500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	6850.000	0.0	11040.000	0.0	0.0	0.0	0.0
GR	1017.000	5550.000	1012.000	5620.000	1010.000	5640.000	1008.000	6150.000	1010.000	6350.000
GR	1010.000	6400.000	1008.000	6550.000	1006.000	6680.000	1004.000	6810.000	1002.000	6850.000
GR	1000.000	7240.000	1000.000	8620.000	998.000	8660.000	998.000	8930.000	1000.000	9170.000
GR	1000.000	9620.000	998.000	9630.000	1000.000	9950.000	1000.000	10000.000	1000.000	10010.000
GR	998.000	10020.000	996.000	10030.000	994.000	10040.000	994.000	10100.000	994.000	10150.000
GR	992.000	10490.000	992.000	10790.000	990.000	10800.000	990.000	10820.000	996.000	10840.000
GR	990.000	10860.000	990.000	11050.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	8.180	37.000	10000.000	10000.000	1650.000	1550.000	1580.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	7350.000	0.0	10990.000	0.0	0.0	0.0	0.0
GR	1013.500	6430.000	1010.000	6520.000	1010.000	6630.000	1012.000	6890.000	1010.000	6910.000
GR	1010.000	7320.000	1008.000	7330.000	1006.000	7340.000	1004.000	7360.000	1002.000	8410.000
GR	1004.000	8420.000	1004.000	8430.000	1002.000	8600.000	1004.000	8660.000	1006.000	8684.000
GR	1006.000	9370.000	1008.000	9390.000	1000.000	9450.000	1000.000	9560.000	999.000	9570.000
GR	1000.000	9580.000	1002.000	9585.000	1004.000	9680.000	1006.000	9760.000	1006.000	9970.000
GR	1005.000	10000.000	1004.000	10060.000	1002.000	10070.000	1000.000	10100.000	998.000	10160.000
GR	996.000	10170.000	994.000	10180.000	994.000	10400.000	996.000	10520.000	998.000	10550.000
GR	1000.000	10600.000	1000.000	11000.000	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.190	40.000	9730.000	10090.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	7350.000	0.0	12950.000	0.0	0.0	0.0	0.0
GR	1018.000	6900.000	1018.000	7000.000	1010.000	7000.102	1007.500	7180.000	1006.000	7360.000
GR	1004.000	7540.000	1004.000	8080.000	1005.000	8260.000	1004.700	8440.000	1004.000	8540.000
GR	1005.500	8620.000	1005.000	8800.000	1004.000	8980.000	1005.000	9340.000	1005.000	9600.000
GR	1004.000	9730.000	1001.000	9880.000	996.000	9950.000	995.000	10000.000	1003.000	10090.000
GR	1003.000	10220.000	1004.000	10310.000	1004.000	10600.000	1003.000	10810.000	1002.000	11000.000
GR	1005.500	11100.000	1003.000	11190.000	1003.500	11360.000	1003.000	11540.000	1003.000	11810.000
GR	1004.000	11900.000	1004.700	12090.000	1003.500	12260.000	1003.500	12440.000	1003.000	12610.000
GR	1003.000	12800.000	1005.500	12900.000	1006.000	12960.000	1018.000	12960.102	1018.000	13100.000
SB	1.050	15.500	2.700	0.0	6000.000	1100.000	22150.000	0.0	993.000	993.000
X1	8.200	0.0	0.0	0.0	15.000	15.000	15.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	7280.000	0.0	12950.000	0.0	0.0	0.0	0.0
BT	6.000	6900.000	1018.000	0.0	7000.000	1018.000	0.0	7000.102	1017.000	1010.000
BT	12960.000	1014.000	1007.000	12960.102	1018.000	0.0	13100.000	1018.000	0.0	0.0
X1	8.210	23.000	5550.000	5610.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2950.000	0.0	8500.000	0.0	0.0	0.0	0.0
GR	1012.000	2500.000	1008.000	2770.000	1004.000	3690.000	1003.000	4000.000	1004.000	4700.000
GR	1005.000	5000.000	1004.000	5330.000	1000.000	5340.000	1000.000	5420.000	1002.000	5500.000
GR	1000.000	5550.000	996.000	5610.000	995.000	5630.000	996.000	5650.000	1000.000	5700.000
GR	1004.000	6430.000	1004.000	6630.000	1003.000	7300.000	1004.000	7460.000	1004.000	8400.000
GR	1008.000	8560.000	1012.000	8670.000	1016.000	9810.000	0.0	0.0	0.0	0.0
X1	8.215	35.000	10000.000	10000.000	80.000	80.000	80.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	7110.000	0.0	10600.000	0.0	0.0	0.0	0.0
GR	1013.700	6370.000	1011.500	6660.000	1010.000	6870.000	1008.000	6930.000	1008.000	7050.000
GR	1006.000	7240.000	1008.000	7300.000	1010.000	7330.000	1010.000	7350.000	1008.000	7370.000
GR	1006.000	7380.000	1004.000	7450.000	1004.000	8440.000	1006.000	9160.000	1004.000	9270.000
GR	1002.000	9480.000	1000.000	9550.000	1000.000	9570.000	990.000	9620.000	980.000	9640.000
GR	980.000	9920.000	990.000	9960.000	1000.000	9980.000	1000.000	10000.000	1000.000	10160.000
GR	998.000	10180.000	996.000	10200.000	996.000	10480.000	998.000	10560.000	1000.000	10570.000
GR	1010.000	10630.000	1010.000	10670.000	1020.000	10690.000	1010.000	10840.000	1010.000	10960.000
X1	8.410	37.000	10000.000	10000.000	950.000	1000.000	1000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	7500.000	0.0	10990.000	0.0	0.0	0.0	0.0
GR	1016.000	6860.000	1018.000	7150.000	1018.000	7330.000	1016.000	7400.000	1014.000	7420.000
GR	1012.000	7440.000	1010.000	7460.000	1008.000	7480.000	1006.000	7490.000	1006.000	9220.000
GR	1004.000	9400.000	1002.000	9420.000	1002.000	9470.000	1004.000	9510.000	1006.000	9540.000
GR	1008.000	9600.000	1010.000	9610.000	1016.000	9625.000	1016.000	9660.000	1010.000	9670.000
GR	1006.000	9700.000	1000.000	9730.000	998.000	9750.000	997.000	9950.000	999.000	10000.000
GR	1000.000	10060.000	1010.000	10090.000	1010.000	10140.000	1000.000	10160.000	1000.000	10570.000
GR	1010.000	10590.000	1010.000	10620.000	1000.000	10650.000	990.000	10700.000	980.000	10750.000
GR	978.000	10880.000	980.000	11000.000	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 1

CCHV=   0.100 CEHV=   0.300
*SECNO 5.550

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     2  TARGET=    1500.000
     5.55      6.88   974.88      0.0    979.90   975.40      0.53      0.0       0.0    973.00
   16000.    15067.       0.     933.     2529.       0.      348.       0.        0.    973.00
      0.0      5.96      0.0      2.68    0.045    0.035     0.040      0.0    968.00   9315.61
 0.004984       0.        0.       0.        0        0         6      0.0   1113.31  10428.92

*SECNO 5.820

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.82      5.49   977.49      0.0      0.0   977.66      0.17      2.22      0.04    973.00
   16000.    13296.       0.    2704.     3883.       0.     1002.      91.       25.    973.00
      0.09      3.42      0.0      2.70    0.045    0.035     0.040     0.034   972.00   9250.00
 0.001193     1050.     1000.     900.        4        0         0      0.0   1097.46  10347.45

*SECNO 5.850

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.85      3.56   979.01      0.0      0.0   979.36      0.35      1.65      0.05    975.45
   16000.     7529.       0.    8471.     1697.       0.     1697.     169.       46.    975.45
      0.14      4.44      0.0      4.99    0.045    0.035     0.040     0.034   975.45   9440.77
 0.004081      820.      820.     820.        3        0         0      0.0   1118.46  10559.23


SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.60      2.60   1500.00   1100.00     90.00  11276.00      3.76    975.52    975.45

CCHV=   0.100 CEHV=   0.300
*SECNO 5.860
CLASS A LOW FLOW

3420 BRIDGE W.S.=    978.99 BRIDGE VELOCITY=,      4.46      CALCULATED CHANNEL AREA=,      3551.
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST
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X above J-10

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EGPRS      EGLWC      H3       QWEIR      QPR       BAREA    TRAPEZOID      ELLC      ELTRD
                                                              AREA
   0.0     979.44     0.09       0.     16000.     11276.     11696.      986.64     990.00


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     5.86      3.58   979.10     0.0       0.0    979.44     0.34      0.08      0.0     975.52
   16000.     8000.      0.     8000.     1705.       0.    1705.      174.      48.     975.52
     0.14      4.69     0.0      4.69     0.018     0.018    0.018     0.034   975.52   9440.71
 0.000725      61.      61.      61.        0         0        0       0.0   1118.57  10559.28


*SECNO 6.330

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     6.33      3.19   979.93     0.0       0.0    980.38     0.45      0.91      0.03    976.74
   16000.     8000.      0.     8000.     1489.       0.    1489.      248.      74.     976.74
     0.19      5.37     0.0      5.37     0.018     0.018    0.018     0.028   976.74   9443.87
 0.001133     1100.    1020.     930.        3         0        0       0.0   1112.25  10556.12


*SECNO 6.710

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     6.71      2.76   981.72     0.0       0.0    982.36     0.64      1.92      0.06    978.96
   16000.     8000.      0.     8000.     1247.       0.    1247.      329.     107.     978.96
     0.25      6.41     0.0      6.41     0.018     0.018    0.018     0.025   978.96   9445.03
 0.002043     1290.    1290.    1290.        2         0        0       0.0   1109.94  10554.97


*SECNO 6.960

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     6.96      3.01   984.02     0.0       0.0    984.54     0.51      2.17      0.01    981.01
   16000.     8000.      0.     8000.     1390.       0.    1390.      407.     139.     981.01
     0.31      5.76     0.0      5.76     0.018     0.018    0.018     0.024   981.01   9444.30
 0.001425     1280.    1280.    1280.        2         0        0       0.0   1111.40  10555.70


*SECNO 7.120
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOPL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.12      2.92    985.45     0.0       0.0     986.01     0.56      1.46      0.01    982.53
   16000.     8000.        0.    8000.     1329.        0.    1329.      466.      164.    982.53
     0.35      6.02       0.0     6.02     0.018     0.018    0.018     0.023    982.53   9444.61
 0.001654      950.      950.     950.         2         0        0       0.0   1110.78  10555.39


*SECNO 7.360

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.36      2.94    987.47     0.0       0.0     988.02     0.54      2.01      0.00    984.53
   16000.     8000.        0.    8000.     1353.        0.    1353.      543.      195.    984.53
     0.41      5.91       0.0     5.91     0.018     0.018    0.018     0.022    984.53   9444.49
 0.001560     1250.     1250.    1250.         1         0        0       0.0   1111.02  10555.51


*SECNO 7.650

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.65      2.50    989.73     0.0       0.0     990.55     0.82      2.45      0.08    987.23
   16000.     8000.        0.    8000.     1103.        0.    1103.      608.      225.    987.23
     0.46      7.25       0.0     7.25     0.018     0.018    0.018     0.021    987.23   9445.45
 0.003069     1150.     1150.    1150.         2         0        0       0.0   1109.09  10554.54


CCHV=   0.100 CEHV=   0.300
*SECNO 7.885

3265 DIVIDED FLOW

3280 CROSS SECTION       7.89 EXTENDED       5.28 FEET


3470 ENCROACHMENT STATIONS=    6850.0    11040.0  TYPE=      1  TARGET=    4190.000
     7.89      5.28    995.28     0.0       0.0     995.70     0.42      5.11      0.04   1000.00
   16000.        0.        0.   16000.        0.        0.    3093.      700.      262.   1000.00
     0.54       0.0       0.0     5.17     0.045     0.035    0.040     0.023    990.00  10033.61
 0.003672     1750.     1500.    1450.         3         0        0       0.0   1001.57  11040.00


*SECNO 8.180
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end of
Ref unpaved

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST


3265 DIVIDED FLOW

3280 CROSS SECTION       8.18 EXTENDED       0.42 FEET

3470 ENCROACHMENT STATIONS=     7350.0    10990.0  TYPE=      1  TARGET=     3640.000
     8.18      6.42  1000.42      0.0       0.0   1001.01      0.59      5.26      0.05   1005.00
   16000.       80.       0.   15920.       65.       0.    2573.      802.      298.   1005.00
     0.61      1.23      0.0      6.19     0.045     0.035     0.040     0.025    994.00   9446.87
 0.003144     1650.    1580.    1550.         2         0         0       0.0   1030.43  10990.00


*SECNO 8.190

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     7350.0    12950.0  TYPE=      1  TARGET=     5600.000
     8.19      9.14  1004.14  1004.14       0.0   1004.74      0.60      0.18      0.00   1004.00
   16000.       48.   11133.    4819.       87.    1536.    2000.      806.      301.   1003.00
     0.61      0.55      7.25     2.41     0.045     0.035     0.040     0.025    995.00   7527.34
 0.004223       50.       50.      50.        20        12         0       0.0   3496.56  12845.62


SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05     15.50      2.70      0.0    6000.00   1100.00  22150.00      0.0     993.00    993.00

*SECNO 8.200

3265 DIVIDED FLOW

CLASS A LOW FLOW

3420 BRIDGE W.S.=   1004.13 BRIDGE VELOCITY=,      0.29      CALCULATED CHANNEL AREA=,     54560.
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID AREA      ELLC      ELTRD
  0.0   1004.78     0.25        0.    16000.    22150.    83300.    1010.00   1014.00

3470 ENCROACHMENT STATIONS=   7280.0   12950.0  TYPE=    1  TARGET=   5670.000
     8.20      9.39  1004.39     0.0       0.0  1004.78     0.39      0.05      0.0   1004.00
   16000.      244.    9990.    5766.     294.    1624.    2616.      807.      302.   1003.00
     0.61      0.83     6.15     2.20    0.045    0.035    0.040     0.025    995.00   7505.20
 0.002821       15.      15.      15.        0        0        0       0.0   3903.57  12855.47

*SECNO 8.210

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=   2950.0    8500.0  TYPE=    1  TARGET=   5550.000
     8.21      9.79  1004.79     0.0       0.0  1004.89     0.09      0.07      0.03   1000.00
   16000.     4042.    1876.   10082.    2486.     408.    4748.      814.      307.    996.00
     0.62      1.63     4.60     2.12    0.045    0.035    0.040     0.025    995.00   3506.96
 0.000915       50.      50.      50.        2        0        0       0.0   4796.21   8431.83

*SECNO 8.215

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=   7110.0   10600.0  TYPE=    1  TARGET=   3490.000
     8.22     24.88  1004.88     0.0       0.0  1004.90     0.02      0.01      0.01   1000.00
   16000.    12743.       0.    3257.   10757.       0.    4303.      835.      314.   1000.00
     0.64      1.18      0.0     0.76    0.045    0.035    0.040     0.025    980.00   7419.21
 0.000027       80.      80.      80.        2        0        0       0.0   2715.05  10599.27

*SECNO 8.410

3265 DIVIDED FLOW
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3280 CROSS SECTION      8.41 EXTENDED     24.90 FEET

3470 ENCROACHMENT STATIONS=    7500.0    10990.0  TYPE=     1  TARGET=    3490.000
     8.41     26.90  1004.90     0.0       0.0   1004.93     0.03      0.03      0.00    999.00
   16000.     1494.       0.   14506.    2305.       0.   10170.     1143.      359.    999.00
     0.84      0.65      0.0     1.43     0.045     0.035    0.040     0.026    978.00   9318.84
 0.000033      950.    1000.    1000.         2         0        0       0.0   1358.20  10990.00
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*************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
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T1       AGUA FRIA CHANNEL * I-10 TO INDIAN SHCOOL ROAD *
T2 IMPROVED CHANNEL W/ N-VALUE=.018  WITH MCDOWELL RD BRIDGE
T3       1100 BOTTOM WIDTH 311 SIDE SLOPES Q25

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.       3.        0.        0.  0.005000      0.0       0.0       0.   979.900     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     2.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=   0.100 CEHV=   0.300
*SECNO 5.550

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     2  TARGET=    1500.000
     5.55      9.63    977.63      0.0    979.90    978.54      0.91       0.0       0.0     973.00
   49000.    36543.        0.   12457.     4432.        0.     2238.        0.        0.     973.00
     0.0      8.24       0.0      5.57     0.045     0.035     0.040       0.0    968.00    9301.84
 0.004997       0.        0.        0.         0         0         4       0.0   1448.16   10750.00

*SECNO 5.820

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     5.82      8.83    980.83      0.0       0.0    981.26      0.43      2.67      0.05     973.00
   49000.    35498.        0.   13501.     6390.        0.     3091.      185.       33.     973.00
     0.05      5.56       0.0      4.37     0.045     0.035     0.040     0.035    972.00    9250.00
 0.001633     1050.     1000.      900.         3         0         0       0.0   1500.00   10750.00

*SECNO 5.850

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=     0  TARGET=    1500.000
     5.85      6.98    982.43      0.0       0.0    983.15      0.72      1.80      0.09     975.45
   49000.    23059.        0.   25941.     3626.        0.     3626.      343.       58.     975.45
     0.09      6.36       0.0      7.15     0.045     0.035     0.040     0.035    975.45    9428.48
 0.003118      820.      820.      820.         2         0         0       0.0   1143.03   10571.51

SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.60      2.60   1500.00   1100.00     90.00  11276.00      3.76    975.52    975.45

CCHV=   0.100 CEHV=   0.300
*SECNO 5.860
CLASS A LOW FLOW

3420 BRIDGE W.S.=    982.33 BRIDGE VELOCITY=,      6.92      CALCULATED CHANNEL AREA=,     7047.
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID     ELLC      ELTRD
                                                              AREA
  0.0     983.29    0.18        0.      49000.    11276.    11696.      986.64    990.00


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     5.86      7.09    982.61    0.0       0.0      983.29    0.68      0.15      0.0       975.52
   49000.    24500.       0.   24500.    3692.        0.    3692.     353.       59.      975.52
     0.09      6.64      0.0     6.64    0.018      0.018    0.018    0.034    975.52    9428.07
 0.000531      61.       61.     61.        0          0        0      0.0    1143.86   10571.93


*SECNO 6.330

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     6.33      6.39    983.13    0.0       0.0      984.00    0.87      0.65      0.05      976.74
   49000.    24500.       0.   24500.    3279.        0.    3279.     516.       86.      976.74
     0.13      7.47      0.0     7.47    0.018      0.018    0.018    0.029    976.74    9434.96
 0.000778    1100.     1020.    930.        3          0        0      0.0    1130.07   10565.04


*SECNO 6.710

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     6.71      5.23    984.19    0.0       0.0      985.54    1.35      1.40      0.14      978.96
   49000.    24500.       0.   24500.    2629.        0.    2629.     691.      119.      978.96
     0.17      9.32      0.0     9.32    0.018      0.018    0.018    0.025    978.96    9438.04
 0.001617    1290.     1290.    1290.        2          0        0      0.0    1123.93   10561.96


*SECNO 6.960

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     6.96      5.25    986.26    0.0       0.0      987.60    1.34      2.06      0.00      981.01
   49000.    24500.       0.   24500.    2636.        0.    2636.     845.      152.      981.01
     0.20      9.29      0.0     9.29    0.018      0.018    0.018    0.024    981.01    9438.00
 0.001601    1280.     1280.    1280.        2          0        0      0.0    1124.00   10562.00


*SECNO 7.120
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.12      5.25    987.78      0.0       0.0    989.12      1.33      1.52      0.00    982.53
   49000.    24500.        0.   24500.     2643.        0.    2643.      961.      177.    982.53
     0.23      9.27       0.0     9.27     0.018     0.018     0.018     0.023    982.53   9437.96
 0.001589      950.      950.     950.         0         0         0       0.0   1124.07  10562.03


*SECNO 7.360

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.36      5.24    989.77      0.0       0.0    991.11      1.34      1.99      0.00    984.53
   49000.    24500.        0.   24500.     2636.        0.    2636.     1112.      209.    984.53
     0.27      9.30       0.0     9.30     0.018     0.018     0.018     0.022    984.53   9438.00
 0.001603     1250.     1250.    1250.         0         0         0       0.0   1124.00  10562.00


*SECNO 7.650

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=    1500.000
     7.65      4.55    991.78      0.0       0.0    993.63      1.85      2.36      0.15    987.23
   49000.    24500.        0.   24500.     2247.        0.    2247.     1241.      239.    987.23
     0.30     10.90       0.0    10.90     0.018     0.018     0.018     0.021    987.23   9439.23
 0.002722     1150.     1150.    1150.         2         0         0       0.0   1121.53  10560.76


CCHV=   0.100 CEHV=   0.300
*SECNO 7.885
3280 CROSS SECTION       7.89 EXTENDED       7.99 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    6850.0    11040.0  TYPE=      1  TARGET=    4190.000
     7.89      7.99    997.99      0.0       0.0    999.08      1.09      5.38      0.08   1000.00
   49000.        0.        0.   49000.        0.        0.    5843.     1421.      276.   1000.00
     0.35       0.0       0.0     8.39     0.045     0.035     0.040     0.023    990.00  10020.03
 0.004761     1750.     1500.    1450.         2         0         0       0.0   1019.96  11040.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 8.180

3265 DIVIDED FLOW

3280 CROSS SECTION       8.18 EXTENDED       4.00 FEET


3470 ENCROACHMENT STATIONS=     7350.0    10990.0  TYPE=      1  TARGET=     3640.000
     8.18     10.00  1004.00      0.0       0.0   1004.79     0.79      5.68      0.03  1005.00
   49000.     5079.       0.    43921.     1990.       0.    5860.     1667.      340.   1005.00
     0.41      2.55      0.0      7.50     0.045     0.035    0.040     0.025    994.00  7360.18
 0.002889     1650.    1580.     1550.         2         0        0       0.0   2479.76 10990.00


*SECNO 8.190

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     7350.0    12950.0  TYPE=      1  TARGET=     5600.000
     8.19     10.39  1005.39  1005.39       0.0   1006.19     0.80      0.20      0.00  1004.00
   49000.     4968.    19889.   24143.     1984.     1987.    5361.     1676.      345.   1003.00
     0.41      2.50     10.01     4.50     0.045     0.035    0.040     0.025    995.00  7414.55
 0.005712       50.       50.       50.        20         9        0       0.0   5430.45 12895.75


SPECIAL BRIDGE

SB   XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      15.50     2.70      0.0       6000.00   1100.00   22150.00  0.0       993.00    993.00

*SECNO 8.200
CLASS A LOW FLOW

3420 BRIDGE W.S.=   1005.39 BRIDGE VELOCITY=,      0.81      CALCULATED CHANNEL AREA=,     60709.

 EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID     ELLC      ELTRD
                                                             AREA
     0.0   1006.26   0.37      0.        49000.    22150.    83300.    1010.00   1014.00
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```
   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST


3470 ENCROACHMENT STATIONS=    7280.0    12950.0  TYPE=      1  TARGET=    5670.000
     8.20     10.76  1005.76      0.0       0.0   1006.26      0.50       0.07       0.0   1004.00
   49000.     6644.   17345.   25011.     2835.     2119.     6393.      1680.      347.   1003.00
     0.41      2.34     8.19     3.91     0.045     0.035     0.040      0.025    995.00   7381.62
 0.003507       15.      15.      15.         0         0         0        0.0   5549.56  12931.18


*SECNO 8.210

3470 ENCROACHMENT STATIONS=    2950.0     8500.0  TYPE=      1  TARGET=    5550.000
     8.21     11.20  1006.20      0.0       0.0   1006.41      0.21       0.12      0.03   1000.00
   49000.    14956.    3422.   30621.     5576.      492.     8758.      1695.      353.    996.00
     0.42      2.68     6.95     3.50     0.045     0.035     0.040      0.025    995.00   3183.32
 0.001626       50.      50.      50.         2         0         0        0.0   5304.79   8488.11


*SECNO 8.215

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=    7110.0    10600.0  TYPE=      1  TARGET=    3490.000
     8.22     26.35  1006.35      0.0       0.0   1006.45      0.10       0.03      0.01   1000.00
   49000.    38049.       0.   10951.    14326.        0.     5183.      1727.      361.   1000.00
     0.43      2.66      0.0     2.11     0.045     0.035     0.040      0.025    980.00   7207.08
 0.000172       80.      80.      80.         2         0         0        0.0   3265.04  10600.00


*SECNO 8.410

3265 DIVIDED FLOW

3280 CROSS SECTION       8.41 EXTENDED      26.47 FEET


3470 ENCROACHMENT STATIONS=    7500.0    10990.0  TYPE=      1  TARGET=    3490.000
     8.41     28.47  1006.47      0.0       0.0   1006.66      0.19       0.19      0.03    999.00
   49000.     5970.       0.   43030.     4024.        0.    11529.      2118.      433.    999.00
     0.51      1.48      0.0     3.73     0.045     0.035     0.040      0.026    978.00   7500.00
 0.000217      950.    1000.    1000.         2         0         0        0.0   3232.32  10990.00
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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
*****************************************************

T1       AGUA FRIA CHANNEL * I-10 TO INDIAN SHCOOL ROAD *
T2 IMPROVED CHANNEL W/ N-VALUE=.018  WITH MCDOWELL RD BRIDGE
T3       1100 BOTTOM WIDTH 3:1 SIDE SLOPES 050

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        4.        0.        0.  0.005000      0.0       0.0       0.     979.900    0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     3.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
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```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 3

CCHV=   0.100 CEHV=   0.300
*SECNO 5.550

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     2  TARGET=    1500.000
     5.55     10.78   978.78     0.0    979.90   979.90     1.12      0.0       0.0     973.00
   69000.    47804.      0.    21196.    5242.      0.     3103.       0.        0.     973.00
     0.0      9.12      0.0     6.83    0.045    0.035    0.040      0.0     968.00   9292.16
 0.004990      0.        0.      0.        0        0        4       0.0    1457.84  10750.00

*SECNO 5.820

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.82     10.19   982.19     0.0      0.0    982.76     0.57      2.81      0.05     973.00
   69000.    47463.      0.    21537.    7409.      0.     4111.     227.       33.     973.00
     0.05      6.41      0.0     5.24    0.045    0.035    0.040     0.035    972.00   9250.00
 0.001786    1050.     1000.    900.        3        0        0       0.0    1500.00  10750.00

*SECNO 5.850

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.85      8.39   983.84     0.0      0.0    984.79     0.95      1.92      0.11     975.45
   69000.    32471.      0.    36529.    4438.      0.     4438.     419.       58.     975.45
     0.08      7.32      0.0     8.23    0.045    0.035    0.040     0.035    975.45   9423.39
 0.003183     820.      820.    820.        2        0        0       0.0    1153.21  10576.60

SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.60      2.60   1500.00   1100.00    90.00   11276.00     3.76     975.52    975.45

CCHV=   0.100 CEHV=   0.300
*SECNO 5.860
CLASS A LOW FLOW
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

3420 BRIDGE W.S.=    983.68 BRIDGE VELOCITY=,      8.09      CALCULATED CHANNEL AREA=,     8490.

 EGPRS      EGLWC      H3         QWEIR      QPR        BAREA    TRAPEZOID      ELLC       ELTRD
                                                                    AREA
     0.0     984.99     0.25          0.    69000.    11276.     11696.      986.64     990.00


3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     5.86      8.57    984.09      0.0       0.0    984.99      0.90       0.20       0.0     975.52
   69000.    34500.        0.   34500.     4544.        0.     4544.       432.       60.     975.52
     0.08      7.59       0.0     7.59     0.018     0.018     0.018      0.034    975.52    9422.73
 0.000532       61.       61.      61.         0         0         0        0.0   1154.54   10577.27

*SECNO 6.330

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     6.33      7.84    984.58      0.0       0.0    985.68      1.10       0.63       0.06     976.74
   69000.    34500.        0.   34500.     4104.        0.     4104.       633.       86.     976.74
     0.11      8.41       0.0     8.41     0.018     0.018     0.018      0.029    976.74    9430.90
 0.000736     1100.     1020.     930.         3         0         0        0.0   1138.19   10569.09

*SECNO 6.710

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     6.71      6.53    985.49      0.0       0.0    987.13      1.64       1.29       0.16     978.96
   69000.    34500.        0.   34500.     3361.        0.     3361.       854.      120.     978.96
     0.15     10.27       0.0    10.27     0.018     0.018     0.018      0.025    978.96    9434.37
 0.001424     1290.     1290.    1290.         2         0         0        0.0   1131.26   10565.63

*SECNO 6.960

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     6.96      6.33    987.34      0.0       0.0    989.09      1.75       1.93       0.03     981.01
   69000.    34500.        0.   34500.     3247.        0.     3247.      1048.      153.     981.01
     0.18     10.62       0.0    10.62     0.018     0.018     0.018      0.024    981.01    9434.93
 0.001594     1280.     1280.    1280.         2         0         0        0.0   1130.13   10565.06
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOR      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLORL     XLCH      XLORR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 7.120

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.12      6.32    988.85      0.0       0.0    990.61      1.76      1.52      0.00    982.53
   69000.    34500.        0.   34500.     3242.        0.     3242.     1190.      178.    982.53
     0.20     10.64       0.0     10.64     0.018     0.018     0.018     0.023    982.53   9434.96
 0.001603      950.      950.      950.         2         0         0       0.0   1130.07  10565.04

*SECNO 7.360

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.36      6.33    990.86      0.0       0.0    992.62      1.76      2.01      0.00    984.53
   69000.    34500.        0.   34500.     3241.        0.     3241.     1376.      210.    984.53
     0.24     10.65       0.0     10.65     0.018     0.018     0.018     0.022    984.53   9434.96
 0.001605     1250.     1250.     1250.         0         0         0       0.0   1130.07  10565.03

*SECNO 7.650

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.65      5.53    992.76    992.67       0.0    995.12      2.37      2.32      0.18    987.23
   69000.    34500.        0.   34500.     2795.        0.     2795.     1535.      240.    987.23
     0.26     12.34       0.0     12.34     0.018     0.018     0.018     0.021    987.23   9436.27
 0.002621     1150.     1150.     1150.         4        11         0       0.0   1127.44  10563.71

CCHV=   0.100 CEHV=   0.300
*SECNO 7.885

3265 DIVIDED FLOW

3280 CROSS SECTION       7.89 EXTENDED       9.18 FEET

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    6850.0    11040.0  TYPE=      1  TARGET=     4190.000
     7.89      9.18    999.18      0.0       0.0   1000.59      1.41      5.38      0.10   1000.00
   69000.     1175.        0.   67825.      530.        0.     7056.     1766.      291.   1000.00
     0.31      2.21       0.0      9.61     0.045     0.035     0.040     0.023    990.00   8636.41
 0.004973     1750.     1500.     1450.         3         0         0       0.0   1655.55  11040.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLORL     XLCH      XLORR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 8.180

3265 DIVIDED FLOW

3280 CROSS SECTION       8.18 EXTENDED       5.32 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     7350.0    10990.0  TYPE=      1  TARGET=     3640.000
      8.18     11.32  1005.32      0.0       0.0   1006.10      0.79      5.45      0.06  1005.00
   69000.    13595.       0.    55405.     4108.       0.     7135.     2106.      370.   1005.00
      0.37      3.31      0.0      7.76     0.045     0.035     0.040     0.025    994.00  7350.00
 0.002586     1650.     1580.     1550.         2         0         0       0.0   2648.00 10990.00


*SECNO 8.190
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     7350.0    12950.0  TYPE=      1  TARGET=     5600.000
      8.19     10.74  1005.74  1005.74       0.0   1006.76      1.02      0.20      0.07  1004.00
   69000.     9229.    24606.    35164.     2786.     2111.     6333.     2119.      374.   1003.00
      0.37      3.31     11.66     5.55     0.045     0.035     0.040     0.025    995.00  7383.51
 0.007143       50.       50.       50.        20         9         0       0.0   5545.15 12928.66


SPECIAL BRIDGE

SB   XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SK        ELCHU     ELCHD
     1.05      15.50     2.70      0.0     6000.00   1100.00  22150.00    0.0      993.00    993.00

*SECNO 8.200
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1005.73 BRIDGE VELOCITY=,       1.11       CALCULATED CHANNEL AREA=,     62383.

 EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID      ELLC      ELTRD
                                                              AREA
     0.0   1006.85    0.54        0.    69000.    22150.     83300.     1010.00   1014.00
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST


3470 ENCROACHMENT STATIONS=     7280.0    12950.0  TYPE=      1  TARGET=     5670.000
     8.20      11.27   1006.27     0.0       0.0    1006.85     0.57       0.09       0.0    1004.00
   69000.     12113.    20708.   36179.     4057.     2304.    7863.      2124.      376.    1003.00
     0.37       2.99      8.99     4.60     0.045     0.035    0.040      0.025    995.00    7327.06
 0.003780       15.       15.      15.         0         0        0        0.0   5622.94   12950.00


*SECNO 8.210

3470 ENCROACHMENT STATIONS=     2950.0     8500.0  TYPE=      1  TARGET=     5550.000
     8.21      11.73   1006.73     0.0       0.0    1007.01     0.28       0.13       0.03   1000.00
   69000.     22015.     4176.   42809.     6865.      524.   10291.      2142.      383.     996.00
     0.38       3.21      7.97     4.16     0.045     0.035    0.040      0.025    995.00    3061.20
 0.001964       50.       50.      50.         2         0        0        0.0   5438.79    8500.00


*SECNO 8.215

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     7110.0    10600.0  TYPE=      1  TARGET=     3490.000
     8.22      26.90   1006.90     0.0       0.0    1007.07     0.16       0.05       0.01   1000.00
   69000.     53265.        0.   15735.    15834.        0.    5518.      2178.      391.    1000.00
     0.38       3.36       0.0     2.85     0.045     0.035    0.040      0.025    980.00    7154.03
 0.000290       80.       80.      80.         2         0        0        0.0   3337.64   10600.00


*SECNO 8.410

3265 DIVIDED FLOW

3280 CROSS SECTION       8.41 EXTENDED      27.11 FEET


3470 ENCROACHMENT STATIONS=     7500.0    10990.0  TYPE=      1  TARGET=     3490.000
     8.41      29.11   1007.11     0.0       0.0    1007.43     0.32       0.32       0.05    999.00
   69000.      9956.        0.   59044.     5544.        0.   12092.      2613.      464.     999.00
     0.44       1.80       0.0     4.88     0.045     0.035    0.040      0.026    978.00    7500.00
 0.000363      950.     1000.    1000.         2         0        0        0.0   3262.79   10990.00
```

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
*****************************************************

T1       AGUA FRIA CHANNEL * I-10 TO INDIAN SHCOOL ROAD *
T2 IMPROVED CHANNEL W/ N-VALUE=.018  WITH MCDOWELL RD BRIDGE
T3       1100 BOTTOM WIDTH 3:1 SIDE SLOPES Q100

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.       5.        0.        0.  0.0          0.0       0.0       0.   979.900     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    15.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
```

```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 4

CCHV=   0.100 CEHV=   0.300
*SECNO 5.550

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     2  TARGET=    1500.000
     5.55     11.90    979.90      0.0    979.90    981.23      1.33       0.0       0.0     973.00
   91000.    59732.        0.   31268.     6038.        0.     3940.        0.        0.     973.00
     0.0      9.89       0.0      7.94     0.045     0.035     0.040       0.0    968.00    9281.00
 0.004952       0.        0.        0.         0         0         0       0.0   1469.00   10750.00

*SECNO 5.820

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.82     11.48    983.48      0.0       0.0    984.20      0.72      2.91      0.06     973.00
   91000.    60138.        0.   30862.     8372.        0.     5074.      267.       33.     973.00
     0.04      7.18       0.0      6.08     0.045     0.035     0.040     0.035    972.00    9250.00
 0.001912     1050.     1000.     900.         3         0         0       0.0   1500.00   10750.00

*SECNO 5.850

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.85      9.71    985.16      0.0       0.0    986.36      1.20      2.02      0.14     975.45
   91000.    42824.        0.   48176.     5203.        0.     5203.      491.       58.     975.45
     0.07      8.23       0.0      9.26     0.045     0.035     0.040     0.035    975.45    9418.64
 0.003287      820.      820.      820.         2         0         0       0.0   1162.72   10581.36

SPECIAL BRIDGE

SB   XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.60      2.60   1500.00   1100.00     90.00  11276.00      3.76    976.62    975.46

CCHV=   0.100 CEHV=   0.300
*SECNO 5.860
CLASS A LOW FLOW
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3420 BRIDGE W.S.=    984.92 BRIDGE VELOCITY=,      9.22      CALCULATED CHANNEL AREA=,     9826.

 EGPRS      EGLWC       H3        QWEIR      QPR       BAREA   TRAPEZOID      ELLC      ELTRD
                                                                  AREA
    0.0     986.62     0.34         0.    91000.    11276.    11696.      986.64    990.00


3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     5.86      9.98   985.50     0.0      0.0     986.62     1.12      0.26      0.0     975.52
   91000.    45500.       0.   45500.    5359.       0.    5359.      506.       60.     975.52
     0.07      8.49      0.0     8.49    0.018     0.018    0.018     0.034   975.52   9417.67
 0.000539       61.       61.      61.        0         0        0       0.0  1164.65  10582.32

*SECNO 6.330

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     6.33      9.23   985.97     0.0      0.0     987.31     1.34      0.63      0.07    976.74
   91000.    45500.       0.   45500.    4896.       0.    4896.      745.       87.     976.74
     0.10      9.29      0.0     9.29    0.018     0.018    0.018     0.029   976.74   9427.03
 0.000716     1100.     1020.     930.        3         0        0       0.0  1145.94  10572.97

*SECNO 6.710

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     6.71      7.82   986.78     0.0      0.0     988.70     1.92      1.21      0.17    978.96
   91000.    45500.       0.   45500.    4092.       0.    4092.     1011.      121.     978.96
     0.13     11.12      0.0    11.12    0.018     0.018    0.018     0.025   978.96   9430.72
 0.001293     1290.     1290.    1290.        0         0        0       0.0  1138.55  10569.27

*SECNO 6.960

3470 ENCROACHMENT STATIONS=    9250.0   10750.0  TYPE=     0  TARGET=    1500.000
     6.96      7.42   988.43     0.0      0.0     990.58     2.15      1.81      0.07    981.01
   91000.    45500.       0.   45500.    3868.       0.    3868.     1245.      154.     981.01
     0.16     11.76      0.0    11.76    0.018     0.018    0.018     0.024   981.01   9431.84
 0.001557     1280.     1280.    1280.        2         0        0       0.0  1136.32  10568.16
```

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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 7.120

3470 ENCROACHMENT STATIONS=     9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.12       7.38    989.91      0.0       0.0     992.09      2.18       1.50       0.01    982.53
   91000.     45500.        0.    45500.     3841.        0.     3841.     1413.        179.    982.53
     0.18      11.85       0.0     11.85     0.018      0.018     0.018     0.023     982.53   9431.97
 0.001594       950.      950.      950.         2          0         0       0.0    1136.05  10568.02

*SECNO 7.360

3470 ENCROACHMENT STATIONS=     9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.36       7.37    991.90      0.0       0.0     994.09      2.18       2.00       0.00    984.53
   91000.     45500.        0.    45500.     3836.        0.     3836.     1634.        211.    984.53
     0.21      11.86       0.0     11.86     0.018      0.018     0.018     0.022     984.53   9432.00
 0.001601      1250.     1250.     1250.         2          0         0       0.0    1136.00  10568.00

*SECNO 7.650

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9250.0    10750.0  TYPE=      0  TARGET=     1500.000
     7.65       6.46    993.69   993.66       0.0     996.60      2.91       2.30       0.22    987.23
   91000.     45500.        0.    45500.     3326.        0.     3326.     1823.        241.    987.23
     0.24      13.68       0.0     13.68     0.018      0.018     0.018     0.022     987.23   9433.43
 0.002568      1150.     1150.     1150.         4         11         0       0.0    1133.13  10566.56

CCHV=    0.100 CEHV=    0.300
*SECNO 7.885
3280 CROSS SECTION        7.89 EXTENDED       10.38 FEET

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     6850.0    11040.0  TYPE=      1  TARGET=     4190.000
     7.89      10.39   1000.39   998.84       0.0    1001.92      1.54       5.19       0.14   1000.00
   91000.      5812.        0.    85188.     2223.        0.     8299.     2128.        336.   1000.00
     0.28       2.61       0.0     10.26     0.045      0.035     0.040     0.023     990.00   7165.20
 0.004649      1750.     1500.     1450.         6         11         0       0.0    3874.80  11040.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOPL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 8.180

3265 DIVIDED FLOW

3280 CROSS SECTION       8.18 EXTENDED       6.39 FEET


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     7350.0    10990.0  TYPE=      1  TARGET=     3640.000
      8.18     12.39  1006.39      0.0       0.0   1007.22     0.83      5.23      0.07   1005.00
    91000.    23832.       0.   67168.      6288.       0.    8199.     2582.      476.   1005.00
      0.34      3.79      0.0     8.19     0.045     0.035    0.040     0.025    994.00   7350.00
  0.002510     1650.    1580.    1550.         2         0        0       0.0   3611.88  10990.00


*SECNO 8.190

3470 ENCROACHMENT STATIONS=     7350.0    12950.0  TYPE=      1  TARGET=     5600.000
      8.19     11.74  1006.74      0.0       0.0   1007.39     0.66      0.16      0.02   1004.00
    91000.    18589.   24085.   48326.      5179.     2474.    9214.     2600.      481.   1003.00
      0.34      3.59      9.74     5.24     0.045     0.035    0.040     0.025    995.00   7350.00
  0.004033       50.       50.      50.         2         0        0       0.0   5600.00  12950.00


SPECIAL BRIDGE

SR  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05     15.50      2.70       0.0    6000.00   1100.00  22150.00     0.0     993.00    993.00

*SECNO 8.200
CLASS A LOW FLOW

3420 BRIDGE W.S.=   1006.72 BRIDGE VELOCITY=,       1.35       CALCULATED CHANNEL AREA=,     67233.

 EGPRS     EGLVC     H3        QWEIR     QPR       BAREA     TRAPEZOID      ELLC      ELTRD
                                                                 AREA
     0.0   1007.54     0.26        0.   91000.    22150.     83300.     1010.00   1014.00


3470 ENCROACHMENT STATIONS=     7280.0    12950.0  TYPE=      1  TARGET=     5670.000
      8.20     11.99  1006.99      0.0       0.0   1007.54     0.54      0.14      0.0    1004.00
    91000.    19768.   22730.   48502.      5809.     2563.    9920.     2606.      483.   1003.00
      0.34      3.40      8.87     4.89     0.045     0.035    0.040     0.025    995.00   7280.00
  0.003194       15.       15.      15.         0         0        0       0.0   5670.00  12950.00
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 8.210

3470 ENCROACHMENT STATIONS=    2950.0     8500.0  TYPE=      1  TARGET=    5550.000
     8.21      12.35   1007.35     0.0        0.0    1007.68     0.33       0.13       0.02   1000.00
   91000.     30291.     4780.   55929.     8449.      561.   12082.      2629.      490.     996.00
     0.35       3.58      8.52     4.63     0.045     0.035    0.040      0.025    995.00   2950.00
 0.002048       50.       50.      50.         2         0        0        0.0   5550.00   8500.00

*SECNO 8.215

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=    7110.0    10600.0  TYPE=      1  TARGET=    3490.000
     8.22      27.52   1007.52     0.0        0.0    1007.76     0.24       0.06       0.01   1000.00
   91000.     69916.        0.   21084.    17544.        0.    5887.      2670.      498.    1000.00
     0.35       3.99       0.0     3.58     0.045     0.035    0.040      0.025    980.00   7110.00
 0.000423       80.       80.      80.         2         0        0        0.0   3403.23  10600.00

*SECNO 8.410

3265 DIVIDED FLOW

3280 CROSS SECTION       8.41 EXTENDED      27.82 FEET

3470 ENCROACHMENT STATIONS=    7500.0    10990.0  TYPE=      1  TARGET=    3490.000
     8.41      29.82   1007.82     0.0        0.0    1008.28     0.46       0.46       0.07    999.00
   91000.     15715.        0.   75285.     7246.        0.   12721.      3154.      572.     999.00
     0.41       2.17       0.0     5.92     0.045     0.035    0.040      0.026    978.00   7500.00
 0.000519      950.     1000.    1000.         2         0        0        0.0   3296.55  10990.00
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  HEC2 RELEASE DATED NOV 76 UPDATED APR  1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

1100 BOTTOM WIDTH 311 SI

SUMMARY PRINTOUT TABLE 120

SECNO	CWSEL	EG	VCH	10K*S	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
5.550	974.88	975.40	0.0	49.84	6.88	1113.31	0.0	0.01	10000.00	973.00	10000.00	973.00
5.550	977.63	978.54	0.0	49.97	9.63	1448.16	0.0	0.01	10000.00	973.00	10000.00	973.00
5.550	978.78	979.90	0.0	49.90	10.78	1457.84	0.0	0.01	10000.00	973.00	10000.00	973.00
5.550	979.90	981.23	0.0	49.52	11.90	1469.00	0.0	0.01	10000.00	973.00	10000.00	973.00
5.820	977.49	977.66	0.0	11.93	5.49	1097.46	0.0	0.01	10000.00	973.00	10000.00	973.00
5.820	980.83	981.26	0.0	16.33	8.83	1500.00	0.0	0.01	10000.00	973.00	10000.00	973.00
5.820	982.19	982.76	0.0	17.86	10.19	1500.00	0.0	0.01	10000.00	973.00	10000.00	973.00
5.820	983.48	984.20	0.0	19.12	11.48	1500.00	0.0	0.01	10000.00	973.00	10000.00	973.00
5.850	979.01	979.36	0.0	40.81	3.56	1118.46	0.0	0.01	10000.00	975.45	10000.00	975.45
5.850	982.43	983.15	0.0	31.18	6.98	1143.03	0.0	0.01	10000.00	975.45	10000.00	975.45
5.850	983.84	984.79	0.0	31.83	8.39	1153.21	0.0	0.01	10000.00	975.45	10000.00	975.45
5.850	985.16	986.36	0.0	32.87	9.71	1162.72	0.0	0.01	10000.00	975.45	10000.00	975.45
5.860	979.10	979.44	0.0	7.25	3.58	1118.57	0.0	0.01	10000.00	975.52	10000.00	975.52
5.860	982.61	983.29	0.0	5.31	7.09	1143.86	0.0	0.01	10000.00	975.52	10000.00	975.52
5.860	984.09	984.99	0.0	5.32	8.57	1154.54	0.0	0.01	10000.00	975.52	10000.00	975.52
5.860	985.50	986.62	0.0	5.39	9.98	1164.65	0.0	0.01	10000.00	975.52	10000.00	975.52
6.330	979.93	980.38	0.0	11.33	3.19	1112.25	0.0	0.01	10000.00	976.74	10000.00	976.74
6.330	983.13	984.00	0.0	7.78	6.39	1130.07	0.0	0.01	10000.00	976.74	10000.00	976.74
6.330	984.58	985.68	0.0	7.36	7.84	1138.19	0.0	0.01	10000.00	976.74	10000.00	976.74
6.330	985.97	987.31	0.0	7.16	9.23	1145.94	0.0	0.01	10000.00	976.74	10000.00	976.74
6.710	981.72	982.36	0.0	20.43	2.76	1109.94	0.0	0.01	10000.00	978.96	10000.00	978.96
6.710	984.19	985.54	0.0	16.17	5.23	1123.93	0.0	0.01	10000.00	978.96	10000.00	978.96
6.710	985.49	987.13	0.0	14.24	6.53	1131.26	0.0	0.01	10000.00	978.96	10000.00	978.96
6.710	986.78	988.70	0.0	12.93	7.82	1138.55	0.0	0.01	10000.00	978.96	10000.00	978.96
6.960	984.02	984.54	0.0	14.25	3.01	1111.40	0.0	0.01	10000.00	981.01	10000.00	981.01
6.960	986.26	987.60	0.0	16.01	5.25	1124.00	0.0	0.01	10000.00	981.01	10000.00	981.01
6.960	987.34	989.09	0.0	15.94	6.33	1130.13	0.0	0.01	10000.00	981.01	10000.00	981.01
6.960	988.43	990.58	0.0	15.57	7.42	1136.32	0.0	0.01	10000.00	981.01	10000.00	981.01

	SECNO	CWSEL	EG	VCH	10K*S	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
	7.120	985.45	986.01	0.0	16.54	2.92	1110.78	0.0	0.01	10000.00	982.53	10000.00	982.53
	7.120	987.78	989.12	0.0	15.89	5.25	1124.07	0.0	0.01	10000.00	962.53	10000.00	982.53
	7.120	988.85	990.61	0.0	16.03	6.32	1130.07	0.0	0.01	10000.00	982.53	10000.00	982.53
	7.120	989.91	992.09	0.0	15.94	7.38	1136.05	0.0	0.01	10000.00	982.53	10000.00	982.53
	7.360	987.47	988.02	0.0	15.60	2.94	1111.02	0.0	0.01	10000.00	984.53	10000.00	984.53
	7.360	989.77	991.11	0.0	16.03	5.24	1124.00	0.0	0.01	10000.00	984.53	10000.00	984.53
	7.360	990.86	992.62	0.0	16.05	6.33	1130.07	0.0	0.01	10000.00	984.53	10000.00	984.53
	7.360	991.90	994.09	0.0	16.01	7.37	1136.00	0.0	0.01	10000.00	984.53	10000.00	984.53
	7.650	989.73	990.55	0.0	30.69	2.50	1109.09	0.0	0.01	10000.00	987.23	10000.00	987.23
	7.650	991.78	993.63	0.0	27.22	4.55	1121.53	0.0	0.01	10000.00	987.23	10000.00	987.23
	7.650	992.76	995.12	0.0	26.21	5.53	1127.44	0.0	0.01	10000.00	987.23	10000.00	987.23
	7.650	993.69	996.60	0.0	25.68	6.46	1133.13	0.0	0.01	10000.00	987.23	10000.00	987.23
	7.885	995.28	995.70	0.0	36.72	5.28	1001.57	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	7.885	997.99	999.08	0.0	47.61	7.99	1019.96	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	7.885	999.18	1000.59	0.0	49.73	9.18	1655.55	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	7.885	1000.39	1001.92	0.0	46.49	10.39	3874.80	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	8.180	1000.42	1001.01	0.0	31.44	6.42	1030.43	0.0	0.01	10000.00	1005.00	10000.00	1005.00
	8.180	1004.00	1004.79	0.0	28.89	10.00	2479.76	0.0	0.01	10000.00	1005.00	10000.00	1005.00
	8.180	1005.32	1006.10	0.0	25.86	11.32	2648.00	0.0	0.01	10000.00	1005.00	10000.00	1005.00
	8.180	1006.39	1007.22	0.0	25.10	12.39	3611.88	0.0	0.01	10000.00	1005.00	10000.00	1005.00
*	8.190	1004.14	1004.74	7.25	42.23	9.14	3496.56	0.0	0.01	9730.00	1004.00	10090.00	1003.00
*	8.190	1005.39	1006.19	10.01	57.12	10.39	5430.45	0.0	0.01	9730.00	1004.00	10090.00	1003.00
*	8.190	1005.74	1006.76	11.66	71.43	10.74	5545.15	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.190	1006.74	1007.39	9.74	40.33	11.74	5600.00	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.200	1004.39	1004.78	6.15	28.21	9.39	3903.57	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.200	1005.76	1006.26	8.19	35.07	10.76	5549.56	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.200	1006.27	1006.85	8.99	37.80	11.27	5622.94	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.200	1006.99	1007.54	8.87	31.94	11.99	5670.00	0.0	0.01	9730.00	1004.00	10090.00	1003.00
	8.210	1004.79	1004.89	4.60	9.15	9.79	4796.21	0.0	0.01	5550.00	1000.00	5610.00	996.00
	8.210	1006.20	1006.41	6.95	16.26	11.20	5304.79	0.0	0.01	5550.00	1000.00	5610.00	996.00
	8.210	1006.73	1007.01	7.97	19.64	11.73	5438.79	0.0	0.01	5550.00	1000.00	5610.00	996.00
	8.210	1007.35	1007.68	8.52	20.48	12.35	5550.00	0.0	0.01	5550.00	1000.00	5610.00	996.00
	8.215	1004.88	1004.90	0.0	0.27	24.88	2715.05	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	8.215	1006.35	1006.45	0.0	1.72	26.35	3265.04	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	8.215	1006.90	1007.07	0.0	2.90	26.90	3337.64	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	8.215	1007.52	1007.76	0.0	4.23	27.52	3403.23	0.0	0.01	10000.00	1000.00	10000.00	1000.00
	8.410	1004.90	1004.93	0.0	0.33	26.90	1358.20	0.0	0.01	10000.00	999.00	10000.00	999.00
	8.410	1006.47	1006.66	0.0	2.17	28.47	3232.32	0.0	0.01	10000.00	999.00	10000.00	999.00
	8.410	1007.11	1007.43	0.0	3.63	29.11	3262.79	0.0	0.01	10000.00	999.00	10000.00	999.00
	8.410	1007.82	1008.28	0.0	5.19	29.82	3296.55	0.0	0.01	10000.00	999.00	10000.00	999.00

SUMMARY OF ERRORS

```
CAUTION  SECNO=   8.190  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   8.190  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   8.190  PROFILE= 1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION  SECNO=   8.190  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   8.190  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   8.190  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION  SECNO=   8.190  PROFILE= 3  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   8.190  PROFILE= 3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   8.190  PROFILE= 3  20 TRIALS ATTEMPTED TO BALANCE WSEL
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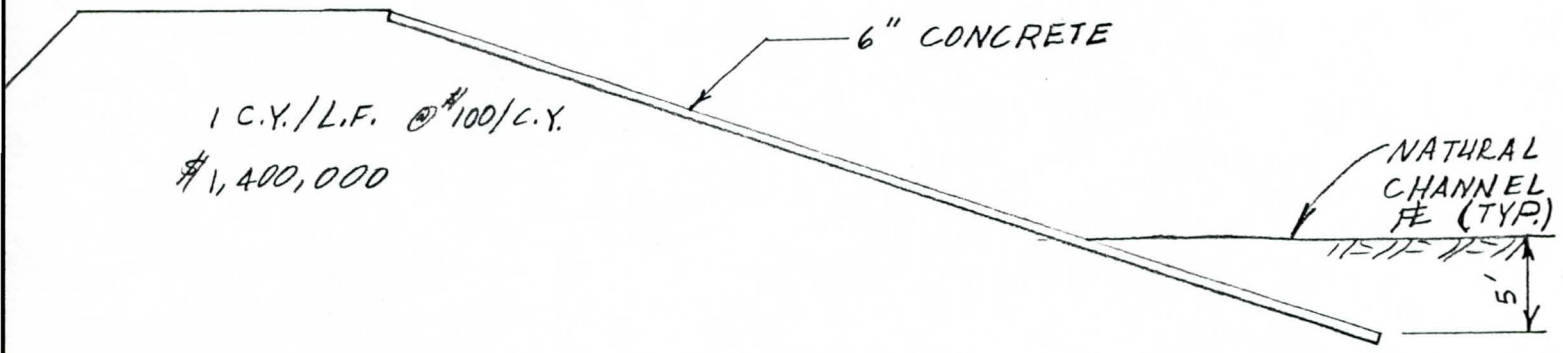
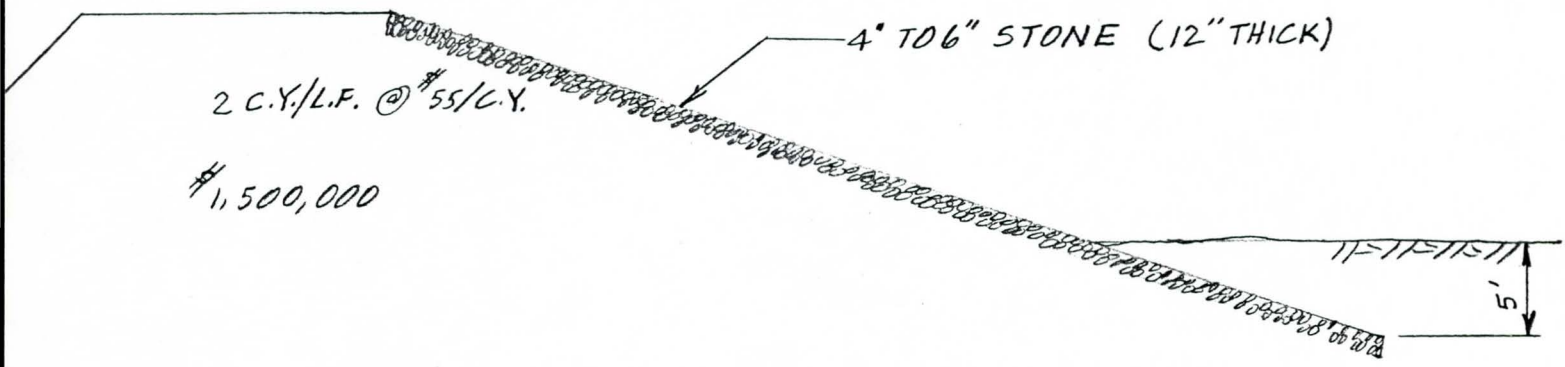
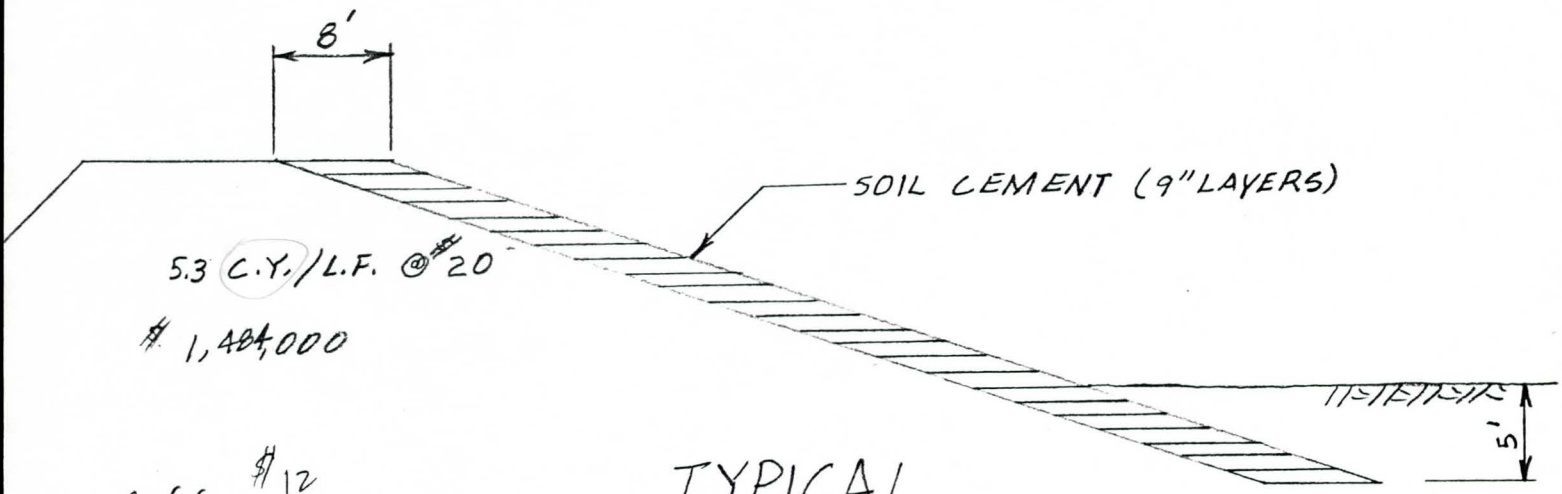
10/4/82 JTD







$12/C.Y. Sub. Gr. 3

$1/C.Y. E+C. Pvmt. 100

$115/L.F. of Bank.

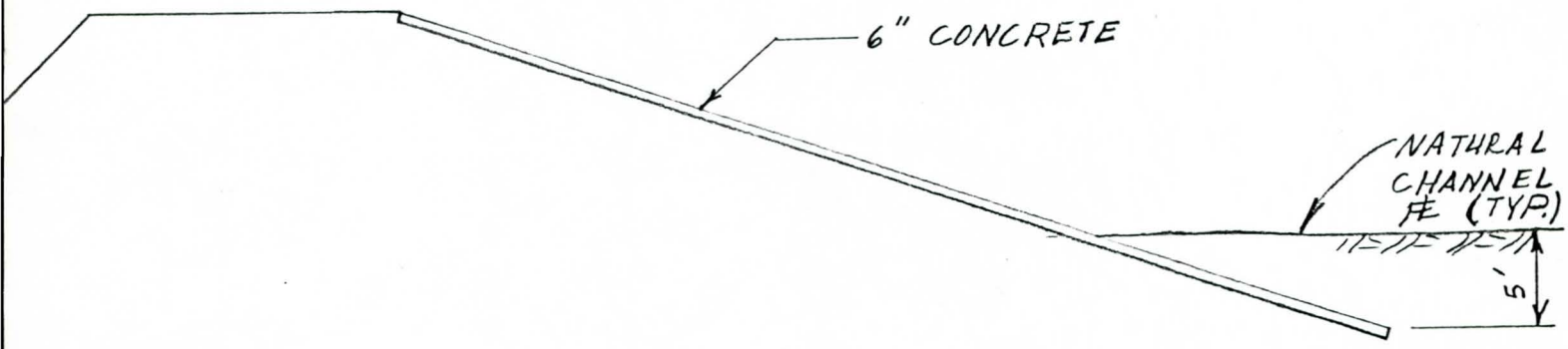
TYPICAL

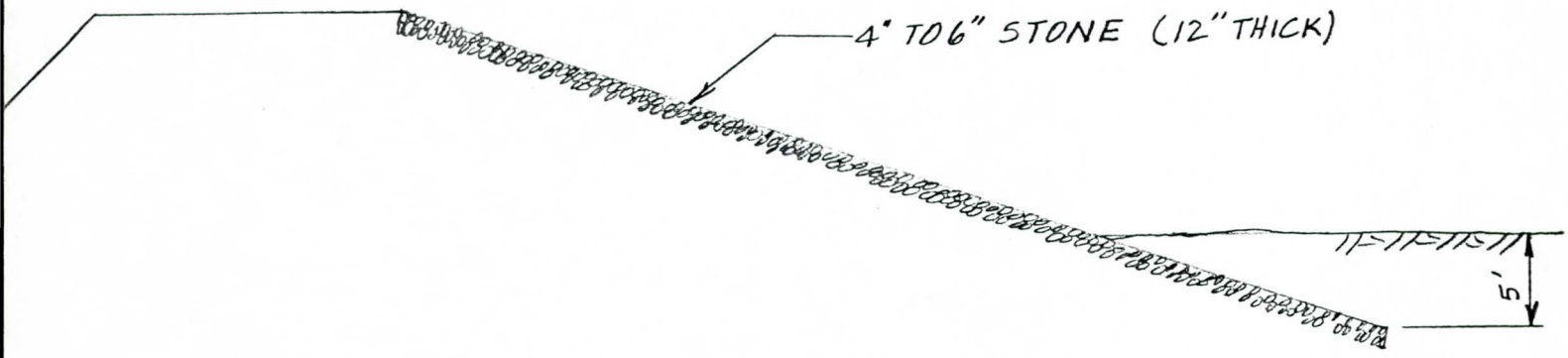
PAVED BANK

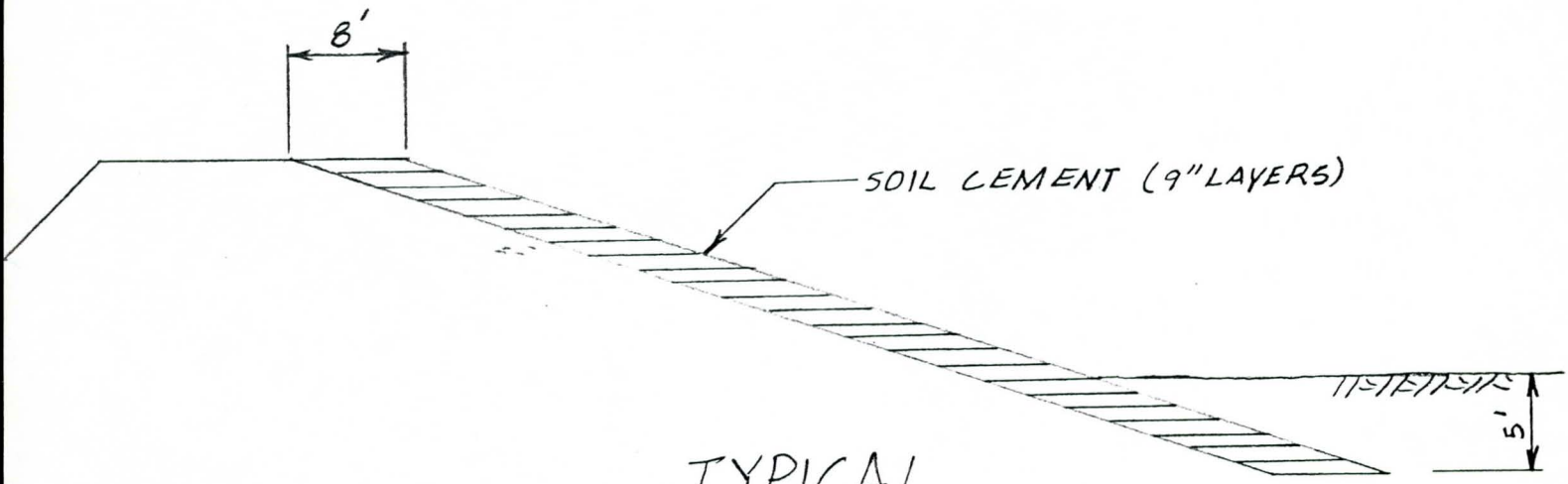
SECTIONS

14,000 L.F. ±

10/4/82 JTD







TYPICAL

PAVED BANK

SECTIONS

14,000 L.F. ±